THE

# JOURNAL OF GAS LIGHTING,

## WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XI. No. 256—14th YEAR.] LONDON, AUGUST 12, 1862. [Subscription per Ann. { 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

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JOURNAL GAS LIGHTING ONE PENNY NEWSPAPER

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THE JURORS HAVE AWARDED TO

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JOSEPH COWEN & CO. were the only parties to whom a Prize Medal was awarded in the Great Exhibition of 1851 for

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This Instrument, which is designed to replace the ordinary Governor,

**Operates solely by the Action of the Gas, without any Alteration of Weights, or the Assistance of any intermediate Agency or Apparatus whatever;**

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**KAY'S PATENT HYDRAULIC VALVE GAS-METERS;**

Also, DRY METERS OF THE MOST APPROVED DESCRIPTION;

All of the above being Stamped under the Provisions of the SALE OF GAS ACT.

W. and B. C. likewise supply ESSON'S PATENT COMPENSATING FOUNTAINS, and KAY'S PATENT HYDRAULIC VALVES, now so extensively used for bringing ordinary Meters within the requirements of the Act of Parliament. Gas Companies can, therefore, either attach the FOUNTAINS or VALVES to their old Meters themselves, or forward them to W. and B. C. for Alteration and Stamping.

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**"EVANS'S" PHOTOMETERS,**

**Experimental Meters, Minute Clocks, &c., Station-Meters and Governors,**

**STREET-LAMP GOVERNORS AND LAVA BURNERS,**

**19 and 20, MARSHAM STREET, WESTMINSTER.**

## INTERNATIONAL EXHIBITION, 1862.

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Class 13, No. 2973.

**PHOTOMETERS, &c.,**

Jury Award: PRIZE MEDAL,

For "Photometric Apparatus—for a well-constructed Apparatus to determine the Illuminating Power of Coal-Gas."

(PHILOSOPHICAL INSTRUMENTS, *North Gallery.*)

Class 31, Section B, No. 6350.

**METERS, GOVERNORS, &c.,**

Jury Award: PRIZE MEDAL,

For "General Excellence of Workmanship, and for his Improvements in Gas-Burners and Photometrical Apparatus."

(*Opposite* AMERICAN DEPARTMENT.)

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SOLE INVENTOR AND FIRST MANUFACTURER

OF THE

**DRY GAS-METER,**

**Which obtained Prizes at the Exhibitions of London, 1851; New York, 1853; Paris, 1855; and three Prizes at the present Exhibition of 1862.**

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W. RICHARDS invites the attention of Gas Companies and Engineers to the Dry Meter manufactured by him, as possessing advantages over others, by his method of disposing of the flexible material, so that collapsing or bagging of the same is avoided. This defect, so conspicuous in some of the meters of other makers shown at the Exhibition, causes the measurement of the instrument to vary under different circumstances, and the durability of the same is materially impaired.

In the meters manufactured by W. Richards, all the metals of the working parts are incorrodible; the flexible material, the best that can be employed; and, in general construction, they are not to be surpassed.

To those who prefer the Wet Meter, W. Richards submits his patented improvements in the same, which consist in contracting the measuring-wheel at, and near, the water-line—thus allowing of a longer range for the float, and avoiding the sudden extinctions now so common; also, a simple remedy is applied to prevent fraudulent consumption, which the operation of the Sales of Gas Act has so much facilitated.

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ANOTHER

MEDAL AWARDED BY THE JURY, INTERNATIONAL EXHIBITION,

1862,

**To THOMAS GLOVER,**

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THOMAS GLOVER has great pleasure in informing Gas Companies and his other Patrons, that the *Jury of Class XXXI. of the International Exhibition of* 1862 have awarded, for his Patent Dry Gas-Meter, *a Prize Medal.* The reason given for this Award, in the Juries Official Report, is, *"For excellence of manufacture, as regards Dry Meters."* See Official Report, p. 346.

It is worthy of remark, that the only two other Firms who receive Awards *both manufacture imitations of Thomas Glover's* Patent Dry Gas-Meter, and the reason given for these Awards is *"construction* and sound workmanship." Thomas Glover, therefore, claims that the *construction* of his Meter has obtained *three Awards from the Jury of the International Exhibition of* 1862; at the same time, *contrasting* the Award granted for his Meter by the words, *"For excellence of manufacture, as regards Dry-Meters."*

The Prize Meter will be found in Class XXXI., No. 6301, connected with a 1-foot holder, to demonstrate that a 50-light Meter *measures and indicates accurately the small quantity of One Foot.*

**WILLIAM PARKINSON AND CO.**

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

**COTTAGE LANE, CITY ROAD, LONDON, E.C.**

**Established 1816.**

**PATENT IMPROVED WET METER.**

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

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Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

**TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,**

**MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.**

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## ERRATUM.

At page 485, second column, for *Captain Cowper Child*, read *Captain Cowper Coles.*

## TO CORRESPONDENTS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

## NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

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# THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

*TUESDAY, AUGUST* 12, 1862.


## Notes upon Passing Events.

THE same commissioners whose recommendations for the embankment of the north side of the Thames have been embodied in one of the few important reform bills of the now past session, have made, on the last day of July, their report on the south side in the following terms:—

We propose to divide this district into three sections: the first, extending from Deptford to Westminster Bridge; the second, from Westminster Bridge to Vauxhall Bridge; and, the third, from Vauxhall Bridge to Battersea Park.

With respect to the first section, as the existing thoroughfares with the new street now being made between Southwark and Blackfriars Road will, in our opinion, afford sufficiently convenient and direct means of communication for the traffic—and as the flooding of the low-lying districts could be obviated by a more efficient system of drainage—there does not appear to us any public necessity for an embankment and roadway between Deptford and Westminster Bridge. The formation of such a roadway would involve a vast expenditure of money, and cause a great disturbance of the trade and commerce of that part of the metropolis. If, however, the owners and occupiers of such wharf property should be desirous at any time of constructing an embankment, which, whilst increasing their own accommodation, would insure uniformity of design and improve the navigation of the river, we are of opinion that every facility should be afforded them for so doing, although we are unable to recommend that the cost should be defrayed by the public.

With respect to the second section, namely, from Westminster Bridge to Vauxhall, we are of opinion that a new and improved communication is necessary, and this, we think, may be effected by constructing any embankment and roadway between these points. The property adjacent to the river between Lambeth Church and Vauxhall Bridge is of an inferior character. The wharf walls are insufficient to keep out the water at high tides; hence many of the streets are at times flooded, causing distress and sickness to the inhabitants, who are for the most part of the poorer classes.

Between Vauxhall Bridge and Battersea Park, which comprises the third section of our inquiry, an embanked roadway would afford access to the Battersea Station of the South Coast Railway, and to the goods station of the South-Western, and Chatham and Dover Railways, would improve and embellish that part of the metropolis, and afford a convenient and agreeable approach to Battersea Park from the densely-populated districts of Lambeth and Southwark.

We, therefore, humbly submit to your Majesty that an embanked roadway of about two miles in length should be formed between Westminster Bridge and Battersea Park, commencing at the east abutment of Westminster Bridge, on a viaduct of an ornamental character opposite to the Houses of Parliament, as far as Bishop's Walk; thence, on a solid embankment to the north side of the London Gas-Works, continued under Vauxhall Bridge as far as Nine Elms on a viaduct, and thence upon a solid embankment, passing under the land arch of the railway-bridge, and terminating at the approach road of the new suspension-bridge at Battersea. The plan and section, which are appended to this report, show the direction and levels of the intended road, and the arrangements proposed for accommodating some of the occupiers of the most important of the water-side premises; and, in suggesting viaducts, we have endeavoured not to interfere, more than is absolutely necessary, with the trades which must be carried on upon the banks of the river.

The dredging of the foreshore in front of the embankment to a level of five feet below low water will (particularly at Lambeth and Nine Elms) improve the navigation, compensate to a great extent for the loss of tidal water displaced by the solid portions of the embankment, and, as the foreshore will be formed, under the viaduct, of solid material, and on a suitable incline, it will tend to prevent accumulations of mud where the shores are flat or uneven.

Communications with the embankment would be made at Stangate, by prolonging Palace New Road, and widening Bishop's Walk on the western side, Church Street, Broad Street, Vauxhall Row, High Street, Battersea Road, near Nine Elms Goods Station, New Park Road leading to Wandsworth, and the station of the London, Chatham, and Dover Railway Company.

The estimated cost of this work, including land and compensation, is £1,100,000; but, it is important to observe that if the present favourable opportunity for carrying out this great work be not at once embraced, the cost will necessarily be much greater, by reason of the increasing demand for land and buildings for trade purposes in and near to the metropolis.

We think that these very moderate recommendations, involving a trifling expense, as compared with the objects gained, will meet with very general approval from men who have paid any attention to the subject. When the pumping-machinery of the south-side main drainage is at work, the chief evils of the low-lying district between Deptford and Westminster will be removed. But the commissioners will have only half done their work if they do not sketch out the outlines of the embankment, which private owners should be encouraged to construct; and, if they do not specify the powers which should be granted to the freeholders by one general Act of Parliament, willing to invest their money in executing a share of this grand improvement. If it be legally settled that freeholders willing to construct embankments in front of their respective river-side properties between Deptford and Westminster are to have the benefit of the land they reclaim, and are to be assisted and protected just as much as if each had obtained a private Act, so long as they comply with the terms specified by the commissioners or other authorities, then we may be assured that all the foreshore between those two points that requires protection and extension will speedily be embanked. But, if the freeholders are to fight a battle with the conservators of the Thames, or the Crown, or with litigious neighbours, for every inch of land reclaimed, the completion of the work will be indefinitely postponed. The second and third sections between Westminster and Vauxhall, and Battersea Park and Vauxhall, the immediate execution of which by the Government is recommended by the commissioners, is scarcely second in importance to the northern embankment. A roadway for heavy traffic between Vauxhall and Westminster has long been urgently required, and is rendered of still more pressing importance from the certain increase of railway-traffic from the south-side railway-stations. Besides, one of the poorest and meanest districts of the metropolis will be made healthy

without being destroyed. It is one of the weak points of many street-improvements, that they involve altogether sweeping away the dwellings of the labouring classes, without substituting anything in their stead. The south-side embankment will make the adjoining low-lying district between Vauxhall and Lambeth Palace dry and healthy, without making it the site of either fashionable houses or great shops. At present, Lambeth and Southwark are terribly ill off for want of those open spaces like the parks of the northern side—one of the great luxuries enjoyed by the poorer class of children in London. The embankment will afford a fine open airy place of exercise and recreation, as may be seen any summer's evening by a visitor to the Chelsea embankment between Vauxhall and new Pimlico Bridge. But, there is one obvious addition to the commissioners plans which they probably did not consider it within their province to suggest. Travellers from Waterloo Station to Vauxhall may see beneath them, surrounded by mean houses and factories, a long green slip of neglected grass-land—a sort of miniature park enclosed in lofty brick walls, grazed over by two or three melancholy cows, and vocal at night with the chaunts of hundreds of cats. This is part of what was once the pleasant deer-park of the Archbishop of Canterbury. At present, it is not even a pleasure-ground. Neither the archbishop nor any of his visitors ever disturb the sooty grass. With the exception of a small strip for securing the privacy of the Palace, it is at present of no value in a park or garden point of view; but, thrown open to the public, and made part of the south-side embankment scheme, properly laid out and kept up like a bit of St. James's Park, it might be made one of the prettiest things in London, and of as great value to the poor of Lambeth as the Temple Garden is to the nurses and children round and about Fleet Street and the Strand. The concession does not, however, rest with the archbishop—with him there would be no difficulty—but with the ecclesiastical commissioners. We commend the idea to some powerful parliamentary or clerical agitator.

Often as we have referred to the main drainage of London, in the course of its execution, and of those early days when it was the subject of the assaults of the professional agitators and amateur engineers of Mr. Chadwick's now extinct school, it may be convenient to give in a few lines a few of the facts and figures relating to the advanced condition of this great undertaking, which, in a brief period, will be in full work. The main drainage has more interest at the present moment, because it is closely connected with the embankments of the Thames, the purification of the Serpentine, and other public improvements of the same character, sanctioned and proposed. On the south side of the Thames, a large district of Lambeth, Bermondsey, and Rotherhithe, is six feet below the high-water level; and, as the sewers must be many feet below the ground, it is only during the brief period of dead low water that they can empty themselves. To make a perfect work, a water-tight wall on the river-side would be required; but, that is too costly an undertaking in the face of the compensation which would be required from every river-side proprietor. In the meantime, the main-drainage tunnels, on both sides of the river, will secure an artificial flow, and turn the branch sewers, now stagnant for eighteen hours out of the twenty-four, into perpetually flowing streams. On the north side, the sewage that has run for years not only into the Thames, but the Serpentine, and every brook not specially protected, devoted to water-works, will be diverted into appropriate channels. The first and highest north side main sewer or tunnel is complete and at work; it runs from Hampstead to Bow, is eight miles in length, receives the present contents of all existing drains, and will receive the contents of all future drains constituted above its course. This tunnel commences with a diameter of 5 feet 6 inches, and goes on increasing in dimensions; until, at its termination near the river Lea, it is 12 feet 6 inches in diameter. At its commencement it has a fall of 50 feet per mile; and, gradually decreasing, its minimum fall is 2 feet per mile. It drains an area of 14 square miles, and is laid from 20 to 26 feet below the ground. The middle level from Kensal Green to Bow is nearly complete. The low level from Cremorne to Abbey Mills will pass through the North Thames Embankment, and be the most difficult work of all, in consequence of the artificial nature of much of the soil on which the City of London is built. The high and middle level reach, and meet at Bow, on lofty aqueducts. Vast steam-pumping machinery at Bow will raise the low-level sewage to the height of the other two; and thence all three, in separate covered canals, will descend, by their own gravity, to a vast reservoir at Barking, which has been constructed for the purpose of containing the whole sewage of ten hours of the north side of London, and any increase for the next two centuries. This reservoir is 1½ mile long by 100 feet wide, and 21 feet deep; roofed over with brick arches, covered with earth several feet thick; and calculated to contain three times the amount of sewage at present supplied. When the tide is at its height, sluices, which pass from the bottom of the reservoir far out into the river, will be opened, and the whole accumulation allowed to flow away—after having been first deodorized by an admixture of lime. Two hours will empty the reservoir, and the fast-flowing tide will carry the deodorized sewage 13 miles down the river, to be mixed with a hundred times greater body of water than that which it now pollutes between Chelsea and Deptford. The deodorization process at Barking is an improvement which has been devised since the commencement of the work. On the south side of the Thames, there are also three main sewers, the most important of which, in a sanitary point of view, is the low level from Putney to Deptford, in its course draining a long, low, poor, and, at present, unhealthy district. This great work, which will scarcely be seen or known of except at the pumping-stations and outfalls, will cost nearly four millions sterling, and make, combined with the Thames Embankments, London the healthiest city in the world.

After ten years of struggles and of work, the Underground Railway has become a reality. Long it languished in the shape of plans and sections, supported by an enthusiastic chairman and an enterprising engineer, without capital or credit enough to tempt a contractor. In the end, tenacity won the day; and, after displacing all the water-pipes, all the gas-pipes, and—wonderful to tell—most of the sewers, on its way, the Underground Railway is about to connect the east and west, and at least three—probably five—railway systems. This undertaking greatly owes its execution to the original mistake which planted the Great Western Station in the wilds of Paddington, and thus denied to the shareholders almost all the profits of suburban traffic. The Great Western directors found themselves compelled to seek a dividend in a City connexion, and this connexion was only to be made underground. At Paddington, therefore, it commences by a junction with the Great Western; and will shortly be united with the station which the broad gauge holds, conjointly with the London and North-Western, at Kensington. From Paddington, it runs literally in a tunnel lighted by gas to a station in the Edgware Road, at the commencement of the Marylebone Road. The Edgware Road Station is in the open air; and, for the rest of its course, wherever possible, open cuttings have been adopted, instead of tunnels. A long section is under the centre of the New Road. At Euston Square, by a grievous error in judgment, no connexion has been formed by the London and North-Western. But this is characteristic of a line as remarkable for its length as the smallness of its dividends, and the largeness of the fortunes realized by its locomotive engineer and solicitors. At Euston Square, there is the first underground station, illuminated in a very ingenious manner, by shafts lined with white glazed porcelain, as well as by gas-lights. At King's Cross, the Great Northern effects a junction with the Underground by two tunnels, one for the up and one for the down line; and then turns away from Pentonville Hill, to meet what is to be the Farringdon Street extension of the London, Chatham, and Dover—a junction delayed, on the one hand, by the irruption of the Fleet Sewer; and, on the other, by the difficulties raised, and only recently disposed of, as to the railway-bridge at Blackfriars. Although much work remains to be done to make the Underground Railway a real junction between Paddington and the City, enough has been done to show that what remains is only straightforward work. All the engineering difficulties have been grappled with, and surmounted. One question only remains—Will it pay? Time alone can solve that; but of the convenience of removing a large passenger traffic by day, and a heavy goods traffic by night, from the streets of London, there can be no question.

The Emperor of the French, with his usual good sense in commercial matters, has adopted the idea, and decided on a line through Paris, and has also engaged the engineer of the metropolitan line, Mr. John Fowler, to superintend its execution. On this, a contemporary, who ought to know better, remarks,

"They manage these things better in France." If he means that the Emperor manages well to engage an experienced engineer, although an Englishman, instead of employing the highly-educated officers at his disposal, he is right; but, if he means that it is better to wait until a novel construction has been tried before it its attempted, why, he propounds a theory that would have made England second instead of first in the greatest engineering enterprises. To appreciate and imitate a success, shows common sense, but it requires many more qualities to adventure and succeed in such an undertaking as the Underground Railway. Financial and legislative difficulties do not obstruct an Emperor, and the engineering difficulties having been overcome are not now experiments, but precedents, thanks to English private enterprise.

We observe, that at the new borough of Birkenhead, the town commissioners propose establishing baths and washhouses. If this undertaking be carried out, it would be worth consideration whether, taking the idea from the best Turkish baths, an economy of water would not be obtained from a certain number of warm and cold douches, which would take up much less room than single baths, and be more effective in washing and refreshing working people.

The International Exhibition of 1862 has supplied to the fullest extent evidence of the folly and uselessness of prizes for encouraging manufactures. The prize medals are now being used by one class of persons just as Lord Aldborough's certificate was used by a noted quack doctor. The owners of patents of doubtful value, toy-sellers, and haberdashers, make a fuss of a reward which is almost an impertinence when bestowed on a first-class manufacturer of anything into which science and skill enter. A column might be filled with the blunders of the juries, but blunders are inevitable where improvised juries undertake to appraise the merit of tens of thousands of articles of the most varied character. We shall be glad to learn that any instance has occurred in which humble merit has been discovered or rewarded by the International jurors. A great many retailers have been medalled for selling articles which obtained no distinction for the manufacturers. Will some advocate of the prize system give us a few facts in support of it out of the South Kensington Exhibition?

The Birmingham manufacturers of small wares are looking forward to an excellent contraband trade with the Federal States, under the new prohibition tariff. For instance, Mr. Bright's friends have imposed a duty of 5s. a gross on an article which may be carried in the hand and bought in Birmingham for five pence!

It is a pity that peers like Lord Kingsdown, a lawyer, and Lord Malmesbury, a country gentleman, did not learn the difference between the chronic pauperism of certain agricultural districts and the blight that has fallen on the cotton districts. The agricultural pauper looks to assistance from poor-rates, or private charity, as a regular aid to wages; in hard winters, when his wife is confined, and when he buries any of his family; blankets and coals are expected every winter; and the loan of baby-linen is accepted, as a matter of course. The Lancashire operatives saved money; had furniture, books, engravings. Many lived in their own houses; and now we learn that in the lately flourishing town of Wigan "in another week, out of 8720 hands actually employed, not 100 will be at work; only 300 are now working full time; and 7480 are entirely without work." Earl Fortescue has been distinguishing himself, as becomes a pupil of Mr. Edwin Chadwick, by calling for the stringent application of the poor-law rules to these afflicted creatures. Earl Fortescue, a well-meaning, but weak-headed man, whose "education has been too much for his abilities," is ready to let all Manchester perish rather than deviate from his master's theory.

## Circular to Gas Companies.

The indefatigable Mr. Samuel Hughes recently contributed to a contemporary periodical a series of articles on public lighting, and those lucubrations he has reprinted in a collected form, "revised and corrected," under the title of "A Treatise on Public Lighting, with Tables of Public Lighting in the Provinces." This publication has been extensively circulated among the local authorities of the large towns in the United Kingdom, and Mr. Hughes has thus contrived to bring himself again into notice, and to get another opportunity for advancing his crotchets, that gas should be supplied to the public lamps at a reduction of 25 per cent. on the price charged to private consumers, and that the local authorities should light and extinguish the lamps. In a brief preface to this treatise, Mr. Hughes disclaims "all intention of any desire to injure the gas companies or depreciate the value of their property." If by *the intention of a desire* he means to signify that he neither intends nor desires to injure gas companies or their property, his acts have been strangely inconsistent with his intentions and wishes, and the manner in which, as he asserts, he is labouring to advance their interests seems, to quote his own words, "in direct opposition to the opinions of a journal which represents a section of the gas companies."

The treatise commences with some general remarks on the advantages of gas, and then proceeds to notice its application to public lighting, and the difficulties which gas companies experienced in the first instance in obtaining permission to lay down their mains; for, as he observes, they "were only too glad to obtain the power of breaking up the streets at any cost, and were quite ready to enter into contracts for the supply of gas to the public lamps at almost any price." This system of extorting from gas companies a supply of gas at less than cost price, Mr. Hughes does not attempt to justify to the extent to which it was at first carried, but he nevertheless advocates the principle of extortion, and contends that the local authority is entitled to a reduction of 25 per cent. below the price charged to ordinary consumers, in consequence of the largeness of the consumption, the certainty of payment, the saving of expense in collection, "and finally, and principally, in return for the liberty of breaking up the public streets, and as some compensation for the serious mischief and expense which this occasions." After noticing the arrangements for conducting the public lighting in various parts of the country, Mr. Hughes adverts to experiments made on the pressure of gas in the mains, for the purpose of repeating the calumny that the quantity of gas actually supplied by gas companies to the public lamps has been 25, and in some instances 39, per cent. less than the contract quantity; and then, assuming his experiments and calculations to be correct, he endeavours to show that at the contract prices the gas companies of London charge considerably more for the quantity of gas actually supplied to the street-lamps than is paid by private consumers. Having established to his own satisfaction this monstrous fallacy, he has little difficulty in showing, *suo more*, that the usual calculated cost of 13s. per annum for lighting, extinguishing, and cleaning each lamp is much too high, and that a less sum than 6s. 6d. per lamp would cover all the expenses. As a means of preventing the alleged fraudulent proceedings of gas companies, Mr. Hughes strongly advocates the supply of gas to the street-lamps by meters; and the kind of meter he recommends is a small dry meter, 6 inches long by 4½ inches wide, and 9 inches deep, to be secured by clips to the lamp-post, and suspended from the lamp-iron; which meter, he says, can be supplied for 22s., with a guarantee to keep it in repair for five years. The other subjects noticed are: the law according to which pressure regulates consumption; the mode of ascertaining the amount of pressure; the control of lighting and extinguishing the lamps; the improvement in public lighting by the introduction of regulators; and, lastly, the French system of lighting and extinguishing lamps without the use of ladders. The tables showing the prices of gas supplied to public lamps in the principal towns in the United Kingdom comprise returns from 151 places; and, ranged in separate columns, there are given the prices paid for each lamp per annum; to whom the lamps belong; who lights, extinguishes, paints, and repairs; the number of hours during which the lamps burn; the number of cubic feet consumed per hour as by contract; deduction for the use of lamps, lighting, &c.; the prices of the gas per lamp; the number of cubic feet consumed by each lamp per annum; the prices paid per 1000 feet for gas in public lamps; and the prices paid by private consumers. These tables, though in several instances inaccurate, constitute the only useful part of Mr. Hughes's pamphlet, the objects of which are evidently to keep his name before the eyes of local authorities; to excite discontent with the gas companies; and to advertise himself as the fitting champion to be professionally retained to procure the redress of fancied grievances.

Nearly everything now brought forward has been asserted

again and again by Mr. Hughes on previous occasions; but the most remarkable part of the present attempt to excite ill-will against gas companies is the endeavour to support his own views by the opinions of Mr. Rutter. It so happens, however, that the opinion expressed by Mr. Rutter, in a pamphlet published in 1860—to the effect that the price to public authorities should be one-fourth less than to private consumers—is most satisfactorily refuted by the arguments advanced by the same gentleman in a pamphlet published in 1849; and also in other portions of the more recent *brochure* from which Mr. Hughes quotes extensively. On referring to the latter pamphlet, entitled, "Gas Lighting: its Progress and its Prospects," we find so many excellent remarks on what Mr. Rutter calls, "the selfish and mistaken policy which has been the principal cause of the high price of gas during so many years," that we cannot refrain from quoting some passages from that publication, for the purpose of showing that Mr. Rutter's arguments tell strongly against, instead of being favourable to, Mr. Hughes's view of the question. After denouncing the "injustice of the street-lamp system, and the course adopted by local authorities in compelling the projectors of gas companies to supply gas to public lamps at unremunerative prices," Mr. Rutter observes—as if in reply to Mr. Hughes's principal reason why the local authority is entitled to a considerable reduction of price—"What were the privileges of which so much was said, and which were thus purchased at so high a price? They consisted only of the permission to lay mains and service-pipes in the streets and other thoroughfares; upon which the authorities soon discovered means of fixing a rate. The mains cause neither expense nor inconvenience to parishes; whilst the parties for whom gas companies are required to make such sacrifices are gainers at every step in their progress." Again, in the following page—"The gas sold to public authorities for the supply of street-lamps being charged at a price that left no profit to the manufacturers, they have been compelled to charge all other classes of customers a price proportionately higher. The frequent boastings of public authorities, of the good bargains they have made with gas companies, if rightly interpreted, mean nothing more than that they, being the stronger body, have cleverly managed to tax the weaker." In the next page, under the head of "Equalization of prices to all classes of consumers," the authority to whom Mr. Hughes appeals further observes: "If it be said, as it often has been, that parochial authorities cannot afford to pay a greater price for gas than they have hitherto done, might it not be replied, that they are not justified in buying what they cannot afford to pay for, any more than they are in taxing, on that plea, one class of parishioners at a higher rate than another? What would be said of a board of guardians who required the poor to be supplied with meat, bread, and other necessaries at one-fourth the usual charges for such articles; assigning, as a reason, that they could not afford to pay higher prices, and, if demanded, the poor must starve?" We might extract many other passages from this storehouse of reasons why the price of gas to public authorities and to private consumers should be equalized; and, in the more recent publication which Mr. Hughes delights to quote, we find even stronger arguments, if possible, against the claim of local authorities for reduction, though the writer most perversely draws a conclusion directly opposed to his own arguments. Thus, when considering the prices to be charged for gas supplied for lighting streets, Mr. Rutter says: "Supposing prices to be equal, the public authorities can never be such good (profitable) customers as private traders or manufacturers. Why not? Because, in supplying gas to street-lamps, the public authorities will stand in the same relation to the company as a given number of small customers; each lamp, in that sense, representing a separate shop or dwelling-house. In what consists the disadvantages? In the relatively greater amount of leakage in one case as compared with the other; the street-lamps requiring as many hundreds of feet of tubing to pass a given quantity of gas as there are tens of feet required to pass the same quantity for the largest private establishments." Mr. Rutter having thus satisfactorily proved that public authorities should not be charged less than private consumers, we are willing to give Mr. Hughes the benefit of the inconsistent and apparently inadvertent subsequent assertion that a reduction should be made in the charge to them. On the question of the quantity actually supplied by the contract system, Mr. Rutter is diametrically opposed to Mr. Hughes, for he affirms that "there is no part of the every-day business of managing gas-works so well known, or so easily ascertained, as that *street-lamps always receive more than their stipulated allowance of gas.*" "The 5 cubic feet per hour," he further remarks, "so easily becomes, and in actual practice so frequently becomes, 5¼, 5½, 5¾, or 6 feet per hour, that the stipulated quantity is the exception, and the quantity in excess the rule." Thus, on the main charge which Mr. Hughes has been continually preferring against gas companies, and on which his advocacy of the application of meters to street-lamps mainly depends, his pet authority entirely deserts him, and he is left with nothing but his own questionable experiments to rest upon.

The quotations we have made from Mr. Rutter's pamphlets afford such complete answers to the principal points of Mr. Hughes's treatise, that it requires but few additional comments. The only real grounds on which any reduction in price can be claimed by local authorities are, that there is, in their case, no risk of bad debts, and that the rental is collected at a less cost than from ordinary customers; but the utmost at which those advantages can be fairly estimated is 2½ per cent. on the rental, against which there is to be set down the increased loss by leakage from the multiplicity of service-pipes. With respect to the claims to control the lighting and extinguishing of the lamps, and to determine the quantity of gas consumed by the registration of meters fixed to one lamp in twelve, they are totally opposed to the principles recognized in all other commercial transactions. We admit that there are instances in which those plans have been adopted by companies, in places where the public authorities have given proof of their good faith and honesty of intention; but, looking at the constitution of nine-tenths of the local authorities, we can understand the repugnance which the gas companies feel to intrust them with the regulation of the gas supplied to the public lamps. The only equitable system of supply is by meters fixed to each lamp, in the base of pillars expressly constructed to receive them. It is questionable whether meters can be lawfully placed *underground* in such a manner as to be readily accessible. The Gas-Works Clauses Act gives power to break up streets for the purpose of "laying pipes," and to "erect any pillars, lamps, or other works, and to do all the acts which the undertakers shall, from time to time, deem necessary for supplying gas to the inhabitants." The question whether opening the ground to place a meter can be reasonably deemed necessary for supplying gas, has been raised in Sheffield, as stated in our last. The Highway Board, on consultation with their legal advisers, abandoned their original intention to summon the gas company before the magistrates; but they resolved to take the law into their own hands, and to fill up the hole wherein the meter is deposited, and to cover it with a large flagstone. We have not yet heard whether this extraordinary resolution has been carried into effect.

The adverse fatality which impends over the efforts of Mr. Flintoff to benefit the public in general and himself in particular, by exciting ill-feeling against the gas companies in Scotland, seems not to be confined to himself, but to extend to those who give him countenance. The fair city of Perth, which he visited in his Scotch tour of agitation, was one of the few places in which his eloquence was so irresistible as to mislead several of the citizens into the formation of a third gas company. The two gas companies established in Perth, known as as the Old and the New Companies, were then, and had been for five years previously, working cordially together under an equitable agreement. The starting of a new company, instigated by Mr. Flintoff, was calculated to unite them still closer; and, at a conference of the directors of the two companies, it was unanimously resolved to make a concession to public opinion, by reducing the price of gas; but that neither company should, directly or indirectly, hold any communication, nor enter into any agreement, with the third company. In an evil hour, however, the New Company broke this resolution, and entered into an alliance with the Consumers Company, to wage war against their former friends. The purport of this treaty was, that the Consumers Company should give all their influence to the New Company, on condition that the latter should, if they succeeded within a year in depriving the Old Company of 5 millions of their consumption, reduce the price of gas permanently to 5s. per 1000 feet. By dint of active canvassing, they succeeded in withdrawing many customers from the Old Company, until the directors adopted the bold resolution

of reducing their price at once to 4s. 2d. per 1000 feet. After an active competition for eight months, the company have now cause to rue the day on which they broke faith with their old friends, and combined with Mr. Flintoff's company against them. The result has been so disastrous, that the New Company cannot pay any dividends, and their stock, which before the agitation was quoted at £6 for each £5 share, is now in the market at £2. The Old Company, on the other hand, though their profits have been reduced, have maintained their finances in a healthy condition, and have been enabled to pay a dividend of 3 per cent. for the half year. Such is the substance of the report just issued by the directors of the Perth Gas-Light Company, and, assuming their representation of the case to be correct, it exhibits a treacherous breach of faith on the part of the New Company, that well deserves the fate it has provoked. The conclusion which the directors draw from their statement is, "the public must now see that with two companies in Perth a permanently low price of gas cannot be maintained; and it will be for them to judge whether it is better to throw the entire consumption into the hands of one company, under proper restrictions, and get cheap gas, or continue the two companies with the risk of future combination and a rise in price." The moral to be derived by the public from this conflict between the two gas companies of Perth is, that the formation of a second company, when one is sufficient for the supply of gas, ultimately throws the burthen of paying for the unnecessary works on the consumers; and gas companies may take warning from the condition of the New Company, against conspiring with agitators to injure another established company.

We noticed, about this time last year, an attempt to revive the lime-light, a company having been then formed to carry out the invention patented by Messrs. Prosser, Bastable, and Standley; but, beyond some preliminary exhibitions, and the trial of the light on the new Westminster Bridge, nothing has been done to establish the practical and economical value of the patent. In the present plethoric state of the money-market, which produces plentiful crops of projects for the employment of surplus capital, another company has been announced, called "The Permanent Lime-Light Company," who have purchased the patents of Mr. Gye, of the Royal Italian Opera-House, and the patent of Captain Bolton, for the application of the lime-light to day and night telegraphy. The capital required is stated to be £120,000, divided into as many shares of £1 each. Mr. Gye's invention is said to have removed the difficulty of maintaining a steady, permanent light, "by the most simple and inexpensive contrivance;" and the usual inducements to purchase shares are held out in the advertised prospectus—that the company will confer great public benefit, and pay large dividends. No details are, however, given respecting the cost of manufacturing the gas for producing the light, and the intensity of its rays is not equal to that of the magneto-electric light, used for some months at the South Foreland Lighthouse, and now shown at the International Exhibition, on which Faraday has made a favourable report. It may serve the purpose of lighthouses to employ intense lights of this description, but for the purposes of ordinary illumination they are not adapted, even admitting that the difficulty of adjustment should be completely overcome, and, what is still more improbable, that the cost should be reduced to less than that of gas. It may be fairly questioned, therefore, whether "The Permanent Lime-Light Company" will stand its ground better than the other similar companies that have started with equal pretensions, and with brighter prospects.

Mr. W. Sugg directs our attention to a slight inaccuracy in our summary of the awards of the juries of the International Exhibition with regard to the medal awarded to him in Class XXXI. B, and which is there represented to be for burners only, whereas it was really for the "general excellence of workmanship" of the meters and pressure-registers exhibited by him in this class, as well as "for his improvements in gas-burners and photometrical apparatus." We have also accidentally overlooked the medal awarded in Class X. B to Messrs. George Glover and Co. for "ingenuity, completeness, and efficiency of apparatus for measuring gas, and for excellence of material and workmanship."

## Register of New Patents.

2763.—Thomas Spencer, of Prescot, Lancaster, earthenware manufacturer, and Thomas Robinson, of St. Helen's, in the same co., engineer, for "*Improvements in machinery or apparatus for making pipes, and other articles of earthenware, and in the form of pipes for gas, sewage, and other purposes.*" A communication. Patent dated Nov. 2, 1861.

This invention refers, firstly, to those machines in which the direct action of steam or other fluid is employed for forcing the plastic material through or into dies, and consists of the employment of an additional power, whereby the pressure after the moulding has been effected is maintained, and the work is effected with a less pressure of the fluid. To this end, the ram or piston is weighted direct, or through the agency of racks or pinions, or equivalent apparatus; and this weighting is accomplished by using a cistern, which may be charged with water or other heavy matter, so that a portion may be drawn off or otherwise removed, as required.

Another part of the invention relates to making articles of earthenware by a plunger, which is forced into a mould, and consists, firstly, in covering the said plunger or mould with cloth, leather, or other such material, which may be peeled off; and, secondly, in giving the said plunger or mould a roughened surface.

Another part of the invention relates to making pipes or other articles with a socket or other design at each end, and consists in forcing the plastic material into a mould for forming one end, which mould is then removed, so as to allow the pressure to force forward the material for the barrel or analogous part; the second socket or end being formed in an upper mould.

Another part of the invention relates to a particular form of pipe for gas, sewage, and other purposes, and consists in forming the said pipe at one end with an enlarged part, within which there is a recess, and at the other end with a part capable of fitting into a similar recess upon another pipe; and it is preferred so to form the said ends, that the interior diameter shall not be interrupted with projections.

2769.—William Clark, of 53, Chancery Lane, in the co. of Middlesex, engineer and patent agent, for "*Improvements in Water-Meters.*" A communication. Provisional protection only obtained. Dated Nov. 4, 1861.

This invention consists in the arrangement within a stationary cylinder or cylindrical pipe of two or more oblique bladed wheels, secured at suitable distances apart on a central shaft, so applied as to rotate freely within the said cylinder or pipe, and two or more series of stationary spiral water-passages surrounding the shaft in the spaces between the said wheels such passages and the blades of the said wheels being set at angles of 45°, or thereabouts, to the axis of the shaft and cylinder or pipe; but their obliquity being in opposite directions relatively to the said axis, so that water passing through the said cylinder or pipe may be caused to strike the blades of the wheels perpendicularly, or nearly so, to the faces thereof, by which system of wheels and passages, the water, as it passes through the cylinder or pipe, is made to act on the several wheels in succession, so that greater power is obtained to give motion to the shaft, and the indicating apparatus which is geared therewith, than could be had with a single wheel, while, at the same time, there is no material increase of friction on the shaft.

2773.—James Livesey, of Manchester, engineer, for "*Improvements in apparatus for communicating from one part of a railway train to another, and for coupling pipes.*" Provisional protection only obtained. Dated Nov. 5, 1861.

The connecting of pipes, to which the second part of this invention refers, is proposed to be made by using a socket lined with india-rubber, or other suitable yielding material, into which a bush with a slightly enlarged end fits. This improved coupling may be used for connecting gas and other pipes; the advantage it possesses over other couplings is, that it can instantly be connected and disconnected.

2795.—John Richardson Wigham, of Capel Street, Dublin, for "*Improvements in apparatus for the manufacture of gas, parts of which are also applicable for cooking purposes.*" Patent dated Nov. 7, 1861.

This invention consists in the peculiar construction or arrangement of a vertical retort for the manufacture of gas, and specially as regards domestic purposes, whereby the waste or surplus heat produced by such retort is made available for domestic or cooking purposes, the retort being heated by means of a circular or other shaped stove or furnace, so arranged that the top plate of the same may be used for cooking. The retort consists of a metal cylinder, which passes through and is surrounded by a furnace, enclosed around its sides with fire-bricks, and mounted upon a suitable frame or standards, the top part of such furnace being covered in by a metal plate, upon which the utensils used in cooking are placed. The cylinder is supported vertically by means of a hollow ring or collar cast upon or around the top part of the same, the under-side of the ring resting upon the metal plate, or top part of the furnace. The hollow part of the ring or collar is filled with a metallic solution, into which a light lid or cover is inserted, serving to close and hermetically seal the upper mouth or opening of the cylinder; the cover is provided with a handle, so that it can be put on or taken off without danger or inconvenience, when it is required to put in a charge. The lower mouth or opening of the cylinder, through which the charge is drawn, is hermetically sealed or closed, by dipping it a sufficient depth into a receptacle containing a liquid "lute," such receptacle being held or supported in the ash-pit beneath. The retort is connected with the ordinary condensing and purifying apparatus, arranged in a compact manner, and connected by a system of water "lutes," hydraulic, or other joints.

The claim is for the construction and use of vertical retorts and furnaces for the manufacture of gas, adapted for domestic or other use, as described. Also, the manner in which the charge of coal, or other gas-making material, is sealed in the retort or retorts, by liquid "lutes," as described; and the arrangement shown and described, when used in combination therewith; but no claim is made for any of the mechanical arrangements shown and described, except as above stated.

2801.—JOHN BARROW, of the Dalton Chemical Works, West Gorton, near Manchester, for "*Improvements in the manufacture of benzole, naphtha, naphthaline, aniline, and carbolic acid.*" Patent dated Nov. 7, 1861.

Heretofore, in the manufacture of benzole, naphtha, naphthaline, aniline, and carbolic acid, the coal-tar of gas-works has been employed, which has of late become of such value, and so insufficient in quantity, as to greatly increase the cost of the manufacture of benzole, naphtha, naphthaline, aniline, and carbolic acid. The patentee has discovered that, by treating coal directly with a view to the manufacture of these products, and by avoiding as much as may be the production of gas, he is enabled more advantageously to manufacture the above-mentioned hydrocarbons. For these purposes, it is preferred to employ retorts, like ordinary iron gas-retorts, set horizontally, but in such manner that, while the bottom and sides are capable of being heated to bright redness, the upper portion of the retort, above the charge, is carefully protected by brick-work from the fire and heat. The retorts are made capable of holding from 8 to 12 cwts., and a series of pipes is connected to each retort, for the purpose of condensing the vapours evolved, which pipes may or may not be surrounded with water. The condensing-pipes from several stills are caused to terminate in one large pipe which is called the main-pipe, and from which the condensed oils are drawn off. Having charged the stills with coal, using by preference that kind of coal known in the neighbourhood of Wigan as cannel slack (although any coal suitable for the manufacture of gas will answer the purpose), it is allowed to remain in the stills as long as any oils are distilled over. The cokes are then raked out, and the stills again charged with slack. It is not found that the production of oils is materially increased or improved by allowing the stills to cool between each operation—although this may be done—and, therefore, the heat is maintained continuously at a bright red, so as to save time. It is advantageous to introduce steam into the retort during the process, or, at least, at the end of the distillation of each charge, to sweep out of the retort the vapours which it contains. This method of distilling differs from that ordinarily practised in distilling coal, in that whilst the bottom and sides of the retort are capable of being highly heated, the top is carefully protected from the heat. This is an important feature of the arrangement; as, were the vapours, when produced, allowed to remain in contact with a highly-heated surface, they would be rapidly decomposed into permanent gas. This is what the gas-maker desires; and it is what, on the contrary, is is here especially desired to avoid.

The crude oils thus obtained are partially purified by one distillation in iron stills, heated by fire beneath, until nothing is left in them but a small portion of pitch. In some cases, the crude oil, and also the oil after the first distillation, deposits, on cooling, crystals of naphthaline; when this is the case, these crystals of naphthaline are separated and pressed dry. The naphthaline is afterwards purified by sublimation or otherwise, as is well understood.

When it is desired to separate aniline and carbolic acid, as is most frequently the case, the crude oils of the first distillation are treated with acid (using by preference hydrochloric acid), which unites with the aniline, and separates it from the other oils; and the remaining oils are treated with alkaline solutions, or solutions of alkaline earths (using by preference caustic soda), which unite with the carbolic acid, and separate it from the remaining oils. From the acid solution of aniline, and the alkaline solution of carbolic acid, both of which readily separate from the oil, is obtained the aniline and carbolic acid, and they are afterwards purified by any of the methods at present used by chemists. The remaining oils, after the separation of the aniline and carbolic acid, if this separation is to be effected, or otherwise the partially rectified oils, are put into a boiler, connected with which is a condensing apparatus, which is to be kept very cold by a good supply of water; and the oils are heated by means of pipes supplied with steam, coiled round the inside of the stills, or by any other method of applying this temperature. The oils which distil over are collected separately by the application of this temperature, which will be at or below 212° Fahr.; these oils will contain benzole, and several other bodies. When these have ceased to come over, jets of steam are caused to blow into the oils, which distil over a second quantity of oils, leaving in the boiler the heavier and less volatile oils. The second quantity of oils distilled over is a mixture of several hydrocarbons, and constitutes crude mineral naphtha.

Having thus separated the crude naphtha, the patentee proceeds to rectify it by similar means to those which are employed for rectifying naphtha obtained from gas-tar, and which are well known—viz., by means of acids and alkalies or alkaline earths (using by preference sulphuric acid and caustic soda); and, to effect this rectification, the crude naphtha is agitated with strong sulphuric acid. After allowing the sulphuric acid to settle, the naphtha is decanted and agitated with a solution of caustic soda; and, after this, they are again distilled by steam (in coils of pipes or steam-jacket), collecting apart that portion which distils over, at, or below, the temperature of 212° Fahr., which portion is added to the benzole already obtained. The remaining portion, or all of it that distils over by the agency of a jet of steam blown into it, is fit for sale as mineral naphtha.

The crude benzole is further rectified by distillation, by acids, oxidizing agents, and alkalies or alkaline earths, in the manner usually practised by chemists; and it may be still further purified, if required, by freezing and pressure.

In some cases, after separating the benzole, the remaining oils are distilled by steam and fire, until the whole is brought over, and these oils are treated with concentrated nitric acid, using the most concentrated acid to be obtained; or a mixture of less concentrated nitric acid and sulphuric acid; or a mixture of a nitrate, as, for instance, nitrate of soda and a double equivalent of sulphuric acid, until the oils separate naturally into a heavy nitrogenous compound, and a lighter fluid oil, which floats on the top. If the first quantity of nitric acid added does not produce this separation, more is added, until the separation takes place. The lighter oil is decanted, and again treated with nitric acid, and afterwards washed with caustic soda, to free it from acid compounds; and thus an oil is obtained, having the property of burning in lamps without smoke, and which it is proposed to use as a substitute for animal or vegetable burning oils, and for other purposes.

The claim is for the manufacture of benzole, naphtha, naphthaline, aniline, and carbolic acid, in the manner hereinbefore set forth.

2815.—FRANÇOIS HENRI MARIE CÔME DAMIENS CHEVALIER FENIS DE LACOMBE, of Paris, France, gentleman, for "*Improvements in generating hydrogen gas for illuminating or other purposes, and in apparatus used therein.*" Provisional protection only obtained. Dated Nov. 9, 1861.

These improvements relate to the generation or evolution of hydrogen gas for illuminating or other purposes, and to the apparatus used thereby, and they consist in projecting water in one or more small jets into an iron or other suitable vessel, kept at a suitable degree of heat by means of a bath of molten lead or other suitable molten metal, and further superheating the steam thus produced by causing the same to come in contact with highly heated metallic parts, and finally introducing this superheated steam with or without the adjunction of atmospheric air into a highly heated retort or retorts, partly filled with carbonaceous or other matters suitable for causing the decomposition of the steam, or, if air be mixed therewith, of the steam and air to take place. Part of the superheated steam, in conjunction with a draught of air, is projected on the fuel in the fireplaces of the retorts, and of the steam generating and superheating vessels.

## APPLICATIONS FOR LETTERS PATENT.

2127.—JOSEPH WALTON, of 335, Strand, London, W.C., Turkish bath builder, and JAMES MOORE, of 11, Upper Berkeley Street, London, W., veterinary surgeon, for "*Improvements in the mode of ventilating and heating rooms, Turkish baths, hothouses, and buildings of all kinds.*" July 28, 1862.

2139.—FRASER SELBY, of Surbiton, Surrey, engineer, for "*Improvements in surface-condensers.*" July 28, 1862.

2140.—HENRY HEDGELEY, of Great College Street, Camden Town, London, N.W., for "*Improvements in lamps.*" July 28, 1862.

2143.—CHARLES WILLIAM SIEMANS, of 3, Great George Street, London, S.W., for "*Improvements in gas-engines.*" July 28, 1862.

2149.—PATRICK SARSFIELD DEOLAN, of the Commercial Foundry, Commercial Street, Manchester, Lancashire, engineer, for "*An improved composition to be employed for covering projectiles and the internal and external surfaces of vessels, which is also applicable to the manufacture of tubing, and to other useful and ornamental purposes.*" July 29, 1862.

2165.—WILLIAM CLARK, of 53, Chancery Lane, London, W.C., engineer, for "*Improvements in gas-burners.*" A communication. July 30, 1862.

2169.—JOHN WYMAN WOODFORD, of Sutherland Street, Walworth, London, S., for "*Improvements in machinery for raising or forcing water.*" July 30, 1862.

2170.—ELIJAH FREEMAN PRENTISS, of Birkenhead, Cheshire, chemist, and ROBERT ADAM ROBERTSON, of Liverpool, Lancashire, brewers and distillers engineer, for "*Improvements in obtaining products from rock-oil, coal-tar, and other like mineral substances in a more or less pure and deodorized state, and in the apparatus to be used therefor, and which is also applicable to distillation in general.*" July 31, 1862.

2178.—JOHN SINCLAIR, of Glasgow, Lanark, N.B., manufacturer, for "*Improved arrangements for ventilating, and in part applicable for fumigating.*" Aug. 1, 1862.

2199.—WILLIAM CLARK, of 53, Chancery Lane, London, W.C., engineer, for "*Improvements in the purification of water, and in apparatus employed therein.*" A communication. Aug. 5, 1862.

2201.—JOHN RICHARD NICHOLL, of Streatham, Surrey, clerk, for "*Improved means of, and apparatus for, utilizing and disposing of the sewage of towns and villages.*" Aug. 5, 1862.

2206.—WILLIAM GEORGE VALENTIN, of the Royal College of Chemists, Oxford Street, London, W., chemist, and FREDERICK LEVICK, of Blaina, Monmouthshire, ironmaster, for "*Improvements in the generation of combustible gases for lighting and heating purposes, and in the mode of applying such gases to the manufacture of iron, glass, and other processes in the arts where great heat is required.*" Aug. 6, 1862.

2212.—FRANÇOIS HENRI MARIE CÔME DAMIENS CHEVALIER DE FENIS DE LACOMBE, of Paris, France, gentleman, for "*Improvements in the means of lighting towns or other localities, and of ventilating, warming, and providing the same with water.*" Aug. 7, 1862.

## GRANTS OF PROVISIONAL PROTECTION.

1955.—JOSHUA KIDD, of Cannon Row, Westminster, London, S.W., engineer, for "*Improvements in gas-meters.*" July 7, 1862.

2054.—JOSEPH RICHARD ABBOTT, of Birmingham, Warwickshire, lamp-manufacturer, for "*Improvements in sliding chandeliers, gaseliers, and other pendent lamps.*" July 18, 1862.

2090.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, London, W.C., and, of 166, Buchanan Street, Glasgow, Lanark, N.B., gentleman, for "*Improvements in the treatment of the noxious gases or vapours produced in the distillation or purification of tar.*" A communication. July 22, 1862.

2140.—HENRY HEDGELEY, of Great College Street, Camden Town, London, N.W., for "*Improvements in lamps.*" July 28, 1862.

## NOTICES TO PROCEED.

778.—EDWARD FIELD, of Buckingham Street, Adelphi, London, W.C., consulting engineer, for "*Improvements in apparatus for regulating the flow of gaseous and other fluids.*" March 20, 1862.

785.—JAMES NEWALL, of Bury, Lancashire, railway-carriage builder, for "*Improvements in supplying gas to railway-carriages, stations, steam-boats, and other vessels, omnibuses, or other carriages, at any required pressure, and in apparatus connected therewith.*" March 21, 1862.

801.—Joseph Henry Tuck, of 35, Cannon Street, London, E.C., for "*Improvements in the manufacture of flexible valves.*" March 22, 1862.

804.—Thomas Frederick Hale, of Bristol, brass-founder, for "*Improvements in valves.*" March 22, 1862.

1196.—John Winsborrow, of 4, Samson Terrace, Marlborough Road, Dalston, London, N.E., gas-meter maker, for "*Improvements in wet gas-meters.*" April 24, 1862.

1891.—Alexander Angus Croll, of Coleman Street, London, E.C., engineer, for "*Improvements in the treatment of ammoniacal liquor of gas-works.*" June 27, 1862.

1934.—James Webster, of Birmingham, Warwick, engineer, for "*Improved apparatus for the manufacture of gas for illumination.*" July 2, 1862.

### PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1731.—William Edward Newton, "*Improvements in extracting oil from coal and other substances yielding pyrogenous oils.*" A communication. July 25, 1859.

1742.—John Davies, "*A new or improved self-adjusting ventilating apparatus.*" July 27, 1859.

1786.—Bryan Donkin, "*Improvements in, and in connexion with, slide and other valves.*" Aug. 2, 1859.

### PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

1680.—Richard Archibald Brooman, "*An improvement in machinery for making pipes and tubes.*" July 24, 1855.

# Parliamentary Intelligence.

## HOUSE OF LORDS.

### Tuesday, July 29, 1862.

The Aberdeen Police, Water, &c., Bill, was read a third time, with the amendments, passed, and sent to the Commons.

The Parochial Assessments Bill was read a third time, with the amendments, passed, and sent to the Commons.

The following Bills received the Royal Assent:—The Highways, and the Petroleum.

### Thursday, July 31.

The Police and Improvement (Scotland) Bill was returned from the Commons, with some of the amendments agreed to, and some disagreed to, with their reason for such disagreement. The said reason to be considered.

### Friday, Aug. 1.

The Parochial Assessments Bill was returned from the Commons, with the amendments agreed to.

The Police and Improvement (Scotland) Bill.—Commons reasons for disagreeing to certain of the amendments made by the Lords were considered. On question, "Whether to insist on the amendments to which the Commons disagree?" it was resolved in the negative.

### Thursday, Aug. 7.

The following Bills received the Royal Assent:—The Parochial Assessments, the Police and Improvement (Scotland), the Salford Improvement, and the Aberdeen Police, Water, &c., Bills.

## HOUSE OF COMMONS.

### Wednesday, July 30, 1862.

The Police and Improvement (Scotland) Bill.—The Lords amendments were considered. Several were agreed to, and several disagreed to. A committee was then appointed, consisting of Sir George Grey, Sir William Dunbar, Mr. Edward Craufurd, Mr. Massey, and Mr. Brand, to draw up reasons to be assigned to the Lords for disagreeing to the amendments to which the Commons had disagreed.

### Thursday, July 31.

The Parochial Assessments Bill.—The Lords amendments were agreed to.

# Miscellaneous News.

## CITY OF LONDON GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of Proprietors was held at the Company's Office, Dorset Street, on Wednesday, Aug. 6—Robert Alexander Gray, Esq., in the chair.

The Secretary (Mr. R. J. Millar) read the advertisement convening the present, and also the minutes of the last, meeting.

The corporate seal having been affixed to the register of proprietors, the Secretary read the following report of the court of directors, and the accounts for the half year, together with the balance-sheet:—

Your directors have much pleasure in commencing their report by announcing that the arrangements referred to last half year for closing the loan-fund, have been completed. Bonds, under the company's seal, have been issued to the holders of the certificates for their respective amounts, except in a few cases where the sums were small. Those have been paid off, and the fund is now closed.

In respect of the Thames Embankment Bill, to which reference was also made in their last report, your directors have to state that they have succeeded in obtaining the introduction of a clause to the effect that the viaduct in front of the company's premises shall be carried upon two arches, each having a span of 70 feet at the least, and a headway beneath the same of not less than 8 feet above Trinity high water-mark. With this provision, your directors hope to be able to carry on the works without much inconvenience, though, as they have before stated, any interference with the free use of the river, which they have possessed for so many years, may be detrimental to the company's interests.

A third matter to which your directors made reference in their last report was the proceedings of the Commissioners of Sewers, for the purpose of exempting the City from the provisions of the Metropolis Gas Act, 1860; and, in respect of this, your directors now report that shortly after your meeting in February, the commissioners instructed the Remembrancer to give notice to withdraw the bill, which had been lodged on the subject, and which was done accordingly.

Your directors proceed to invite your attention to the accounts of the half year, which will be submitted, duly certified by the auditors. The rental is £47,843. 9s. 10d. being an excess over that of the corresponding half year of 1861 of £5267. 15s. 2d., and your directors are gratified to be able to point to a corresponding improvement in the profit and loss account, notwithstanding that upwards of £1000 have been expended in repairing three of the gasholders, and in the enlargement of the tar and ammoniacal liquor-tanks.

The profit for the half year, as per No. 1 statement, is £16,245. 6s. 3d.; and there remains now at your disposal, as per No. 2 statement, the sum of £16,095. 9s. 10s., both subject to income-tax.

Out of this amount, your directors recommend you to declare a dividend for the half year as follows—On the A and new shares at the rate of £9 per cent. per annum; and, on the B shares, at the rate of £4 per cent. per annum; the latter in accordance with the Act of Parliament; the whole to be payable as heretofore free of income-tax at the company's office, on the first Tuesday in October.

It will be perceived that the amount standing at the credit of the reserve-fund, is less than it was at Christmas. This arises from your directors having charged the account with the cost of reinstating portions of the premises which were disturbed in the erection of the new gasholder, and which items were not fairly chargeable to the plant account.

The shareholders are aware that the Company's Clauses Act provides that the salary of the secretary shall be fixed at a general meeting. Your directors have deemed it advisable to revise the salaries of the officers generally, and now recommend you to take into consideration the services of your secretary.

Your directors close their report by announcing that, pursuant to Act of Parliament, James Lamb, Esq., director, and John Thomas Hadland, Esq., auditor, retire by rotation. They are both eligible for their respective offices, and offer themselves for re-election.

R. A. Gray, Chairman.

*Dr.* *Statement of Profit and Loss, for the Half Year ending Midsummer*, 1862. *Cr.*

| | | | | | |
|---|---|---|---|---|---|
| To Cost of coals consumed, including porterage | | £22,386 | 7 7 | By Rental | £47,843 9 10 |
| Rents, rates, and taxes | | 1,043 | 18 8 | Coke | 9,324 8 5 |
| Wages | | 8,432 | 18 10 | Breeze | 414 7 9 |
| Directors and auditors fees | | 506 | 12 6 | Liquor | 612 2 6 |
| Salaries | | 1,975 | 0 0 | Tar | 1,690 11 3 |
| Tradesmen's accounts | | 5,699 | 7 4 | Old materials, &c. | 261 4 5 |
| Repair and depreciation of meters | | 1,488 | 3 5 | Transfer fees | 6 10 6 |
| Petty cash disbursements | | 719 | 0 3 | | |
| Interest | | 1,322 | 7 9 | | |
| Bad debts, &c. | | 333 | 12 1 | | |
| Balance | | 16,245 | 6 3 | | |
| | | £60,152 | 14 8 | | £60,152 14 8 |
| | | | | Balance of profit brought down | £16,245 6 3 |

*Dr.* *General Balance-Sheet, Midsummer*, 1862. *Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To Capital | | £364,000 | 0 0 | By Plant | | £375,042 19 3 |
| Debentures, with interest to date | | 52,005 | 19 6 | Leasehold property | | 5,184 0 0 |
| Reserve-fund | | 5,360 | 10 3 | Amount due for light | £24,203 6 10 | |
| Mr. Benham's benevolent-fund | | 1,000 | 0 0 | Ditto coke, &c. | 5,197 19 10 | |
| Debts due to sundries | | 14,782 | 13 3 | Ditto sundries | 600 14 6 | |
| Balance carried down | | 16,095 | 9 10 | | | 30,002 1 2 |
| | | | | Amount of cash in hand | £10,311 8 0 | |
| | | | | Ditto petty cash | 4 2 3 | |
| | | | | Ditto City gas shares | 2,559 10 0 | |
| | | | | | | 12,875 0 3 |
| | | | | Stock on hand— | | |
| | | | | Coals, &c. | £3,917 16 9 | |
| | | | | Materials | 3,008 7 9 | |
| | | | | Meters | 23,214 7 8 | |
| | | | | | | 30,140 12 2 |
| | | £453,244 | 12 10 | | | £453,244 12 10 |
| | | | | Balance of profit brought down | | £16,095 9 10 |

J. T. Hadland, S. T. Prior, *Auditors.*

The CHAIRMAN: Gentlemen, I shall now, according to my practice on former occasions, address a few observations to the proprietors, and I can assure you that I never felt greater pleasure in addressing you than I do at the present time. It is due, however, to my worthy friends by whom I am surrounded, that I should take this opportunity of acknowledging that, during the period of our greatest depression, the directors never received anything but the greatest consideration from the proprietors. They knew that our unpleasant position arose from no imprudence on the part of those who had the management of their affairs, and I rejoice that to-day we are able to offer them some compensation for the kind forbearance they exercised towards us. I need hardly say that I, for one, would never have recommended the dividend which is now proposed in the report, if I had not the strongest conviction that that dividend we should, at all events, be enabled to continue. (Hear, hear.) The directors feel bound to give the present proprietors all the benefit which, with a due regard to the proper maintenance of the undertaking, they can do. We have always been inimical to the idea of withholding from the present generation that which legitimately belongs to them, with the view to benefit those who are to come after them. I think those who have laboured in the vineyard ought to receive a fair share of the good things produced. It has been stated in the report that we have had to go to Parliament, in consequence of the proceedings upon the Thames Embankment Bill. We asked for no more than we considered we were entitled to, but, not having been able to obtain all, we hope, as is stated in the report, we shall not be much inconvenienced with the provisions that have been made. The bill, which has passed the Legislature, has secured to us a headway of 8 feet, and two arches of 70 feet span. We did ask that, instead of a solid embankment, they would appropriate to our exclusive use all the water between the inner wall and our works; but that, they thought, was too much, and we did not obtain it. Referring, again, to the report and accounts, I think the proprietors will find everything in them to satisfy their minds as to the position of the company. Our worthy friend, Mr. Box, on the last occasion, called our attention to the question of leakage, and, on that point, I would just observe that, though our leakage is even now more than we could wish it to be, there is a considerable improvement in this direction, and I hope, the next time we meet you, we shall be able to tell you we are in a still better position. (Hear, hear.) With regard to the amount of fuel used in carbonizing, I believe we may challenge competition with any company in the metropolis. (Hear, hear.) I do not know that I have much more to state to you. What little I have said has been pleasing to me, and, I feel satisfied, not unacceptable to you. (Hear, hear.) The dividend which we recommend is a very good one; it is one which, as I said before, we believe we shall be able to maintain; and I have no doubt whatever we shall go on prosperously. I am happy to say that we are on terms of friendly intercourse with all the gas companies of London; and I am sure that it will be the aim of your directors to preserve those friendly relations by every means in their power. We, of course, from time to time meet with that class of persons who are never satisfied. There are some people who get so into the habit of complaining that, do what you will, you can never hope to please them. Such persons, if engaged in trade, are always willing and anxious to get all they can out of those who deal with them; but, when they come in contact with a gas company, they are very reluctant indeed to accord even a small share of remuneration to those who have embarked their property in what, after all, is rather a hazardous speculation. Still, I hope that, as far as we are concerned, we shall be able, by supplying good gas at a fair price, to preserve the good-will of our consumers, and to secure, at the same time, to our proprietors the present rate of dividend. (Hear, hear.) I do look forward with confidence that, when we have the pleasure to meet you again, we shall be, if not in a better position than we now are, certainly not in a worse. Before asking you to accept the report, I am desirous to give every proprietor the opportunity of making such inquiries and eliciting such information as he may desire; and I assure you that either myself or my brother directors will be happy to give any explanations that may be in our power. (Cheers.) I move—"That the half-yearly report of the directors now read be received and adopted."

Mr. BOX: I do not rise, sir, to oppose the reception of the report, but to second it; and I will give you my reasons for doing so. I have analyzed the accounts, so far as they have come under my notice; and the statements in the report which has been read by the secretary will confirm the correctness of my analysis. I find that the cost of coals has been considerably less—something like 3s. 6¼d. per ton—during the past half year. The quantity of coals consumed has been 200 tons in excess of the previous half year; but, I cannot ascertain from the accounts whether there has been a corresponding increase in the quantity of gas produced. The improvement in the rental is correctly stated in the report, to the amount of £5267, which is an increase of £18 upon every 100 tons of coal carbonized. I suppose, however, that the increased rental is due, to a great extent, if not entirely, to the rise in the price of gas from 4s. to 4s. 6d. per 1000 feet. I find there has been a decrease in the expenditure to the extent of about 12 per cent., and the net proceeds of the half year, as shown by the accounts, is £16,245. I do not, however, see that that is sufficient to pay the dividend which the directors recommend. It appears to me to be only equal to about 8½ per cent. upon the capital.

The CHAIRMAN: It is evident that you are wrong somewhere in your calculations, because, after paying the 9 per cent. which we recommend, there will be a balance carried down of £2300.

The DEPUTY-CHAIRMAN (Mr. Hadland): I think I can account for Mr. Box's mistake. He perhaps has not noticed that upon £100,000 of our capital we only pay 4 per cent., according to the requirement of our Act of Parliament.

The CHAIRMAN: We pay 9 per cent. upon £264,000, and upon £100,000 only 4 per cent.

Mr. BOX: I was not aware of that fact, which of course will make the difference, and your accounts do not show it.

The CHAIRMAN: We do not think it necessary to state it in the accounts, as we take it for granted that our proprietors are fully acquainted with the fact.

Mr. BOX: With reference to the leakage, I find that it is lower now than it has ever been since I was connected with the company. It has been gradually reduced, but it is not yet so low as I think it ought to be.

The CHAIRMAN: I stated, in my opening remarks, that though the unaccounted-for gas was less than it had been, we were not yet satisfied on that point, and hoped to attain better results in the future.

The motion was then put and carried.

Mr. HARDWICK: Gentlemen, arising out of the resolution just come to, it is my pleasing duty to bring before you the question of dividend. In doing so, I would say that I am sure we must all most heartily rejoice in the increasing prosperity of the company. The chairman has very properly told you that in times past we were in very disheartening circumstances, and that many black clouds hung over our heads. Now, however, those clouds have passed away, and brighter prospects are before us. We are able on this occasion to declare a larger dividend than we have had for many years. Let me ask to whom is the credit due for this satisfactory state of things? I am sure there is but one feeling in the meeting on this point. We all know that it is due to the untiring exertions of our excellent chairman, and his honourable colleagues. (Hear, hear.) It is, therefore, with much pleasure that we meet here to-day to hear their statements, and to express our sense of the satisfactory manner in which they have managed our affairs. (Hear, hear.) With reference to the observations of my worthy friend on my right (Mr. Box), although we may sometimes feel a little impatient at his going into such details as he does, yet we must be gratified to hear one who has had so much experience in gas matters say that, after analyzing the accounts of this company, he cordially approves of the way in which the business is conducted, and the results which have been attained. With these few observations, and expressing a hope that we shall be permitted for many years to meet in this room to express our acknowledgments to the board of directors, I beg to move—"That, agreeably to the recommendation contained in this day's report of the board of directors, a dividend out of the profits of this concern for the half year ending at Midsummer last be now declared as follows:—On the A and new shares at the rate of £9 per cent. per annum, and on the B shares at the rate of £4 per cent. per annum; the whole to be paid, free of income-tax, at the company's office on the first Tuesday in October next, and on each succeeding Friday and Tuesday between the hours of twelve and one o'clock."

Mr. LAVANCHY: It would ill become me, after the lucid remarks of the honourable proprietor who has moved the resolution, to address you at any length in seconding it. I would only say that, in the days when great gloom hung over this undertaking, I was glad to express my confidence in our able captain and his gallant crew. I looked for and fully expected better days, and I now rejoice to find that we have had to wait so short a time for the realization of my hopes. (Hear, hear.) With those few remarks, I cordially second the motion.

The resolution was put, and carried unanimously.

Mr. H. WALMISLEY: I have to propose—"That James Lamb, Esq., be re-elected a director of the company." In doing so, I may, perhaps, be allowed to express a hope, that the directors are taking advantage of the low price of coals to make their purchases.

The DEPUTY-CHAIRMAN: From the remarks of Mr. Box, who told you that our coals have cost 3s. 6d. per ton less than the last half year, you will see that we are making satisfactory purchases.

Mr. WALMISLEY: I have great pleasure in proposing the re-election of Mr. Lamb, for I believe he is fully competent to the duties of the office, from his experience in connexion with other companies.

Mr. HARDWICK seconded the motion.

The CHAIRMAN: I had intended to propose the re-election of Mr. Lamb myself, because I have had the opportunity of judging of his competency. I am happy to say that he has acquitted himself most ably, or I assure you I would not recommend him for re-election.

The motion was cordially adopted.

Mr. LAMB: Mr. Chairman, and gentlemen, I return you my sincere thanks for the handsome way in which you have re-elected me. I have endeavoured to do my duty ever since I have been a member of this board; and I should be paying a poor compliment to myself and to you, if I did not say that I shall continue to follow the same course in the future.

Mr. JAMES HOWELL: I have been requested to propose—"That John Thomas Hadland, Esq., be re-elected an auditor of this company." I am sure the meeting is fully satisfied with the manner in which he has hitherto discharged his duty, and I am pleased that it has fallen to my lot to propose his re-election.

Mr. WARD seconded the motion.

The CHAIRMAN: I think it due to Mr. Hadland to state that I entertain the same opinion respecting him that I expressed on a former occasion. He is a most efficient officer, and I trust that he will long occupy the post he now fills, and enjoy the unabated confidence of the proprietors.

The motion was carried unanimously, and

Mr. HADLAND returned thanks.

The CHAIRMAN: Gentlemen, in the concluding part of the report, the directors state to you that they have been revising the salaries of all the officers of the establishment. We should have done so long since, but it appeared to us that the circumstances of the company did not justify us in increasing our expenses. The period has, however, arrived when we think they are entitled to the addition which we have granted them. This remark applies specially to our worthy and excellent secretary, who has certainly fulfilled all the duties of his office for many years in a most efficient manner. (Hear, hear.) Those duties have been very much increased of late; but, under our Act of Parliament, the directors do not possess the power to increase his remuneration. That function belongs exclusively to the proprietors. With the other officers we have a discretionary power, and that power we have exercised. I am quite sure, however, it will meet the views of the meeting, when the directors recommend for their consideration an increase in the salary of the secretary, as a mark of their high appreciation of his services. I have, therefore, much pleasure in stating that in consideration of the efficient manner in which the duties of the secretary have been discharged, the directors have unanimously agreed to make an addition to his salary of £100 per annum, subject to the confirmation of this meeting.

Mr. WARD: I have much pleasure in seconding the proposition. I have known Mr. Millar for many years, and have witnessed, with much satisfaction, the way in which he has discharged his duties. At the present time, when we are congratulating ourselves that the company is able to pay a dividend of 9 per cent., we ought not to forget what might have been our position, but for the exertions of our officers generally, and especially of our secretary. I am sure any one who has known him so long as I have done, will bear cheerful testimony to the ability, zeal, and urbanity which he has brought to the fulfilment of his office, and, therefore, I second the resolution with great pleasure.

Mr. BOX: May I ask what is the present salary of the secretary?

The CHAIRMAN: £500.

Mr. BOX: I think £600 is as little as he ought to receive.

Mr. HARDWICK: As connected with many public companies, I think £600 a year is as little as you can give your secretary. I did not know till now what his salary was, and should certainly think the proposed addition is both fair and reasonable. (Hear, hear.) We are very glad on such occasions as these to compliment our chairman and directors upon their successful management of our affairs, but we must not allow ourselves to forget how much we are also indebted to our secretary for his exertions in that behalf. I am sure there will be but one opinion upon this point. (Hear, hear.)

A PROPRIETOR: Make it £700.

Mr. HARDWICK: I would rather be guided by the recommendation of the directors; and, in doing so, it will leave a margin for after consideration.

The CHAIRMAN: I need not assure the meeting that, if I did not think

Mr. Millar was entitled to it, I should be the last to propose this increase in his salary.

The motion was unanimously adopted.

Mr. Millar: Mr. Chairman and gentlemen, the vote which you have just adopted is, of course, most acceptable to me, and the feeling which it has elicited has enhanced its value immensely. For the courtesy and kindness with which you, Mr. Chairman, undertook to bring the subject forward, and for the handsome manner in which the meeting has responded to your remarks, I beg to assure you I shall ever feel a deep sense of obligation. I have always endeavoured to do my duty, and I shall endeavour still to do it, stimulated by the expression I have had to-day of the confidence and respect of the directors and proprietors. I will only add that, with reference to the company, I hope the tide of prosperity which has now set in will continue, and that, at least, it will steadily maintain its present position, if not improve it.

The Chairman: With regard to the purchase of coals, to which an honourable proprietor referred, I may state that our contracts are all completed upon terms very satisfactory to the directors.

Mr. Garraway: I have to move—"That the thanks of the proprietors are eminently due, and are hereby given, to the directors, for the great attention they have paid to the interests of the proprietors during the past half year." The extra 2 per cent. which they have offered us to-day was, I think, unexpected by the majority of those present. It is very seldom that a gas company can afford to rise in that large ratio, and I am sure that great care and attention must have been given by the board to the management of our affairs. The increase in the rental I am not surprised at; that may, to some extent, be attributable to the extra 6d. per 1000 feet, but I can clearly see that the £5267 is not wholly accounted for by that. My experience in connexion with gas companies tells me at a glance that it is also attributable to still greater attention, on the part of the board, to the distribution of gas, and, probably, also to better purchases of coal. With reference to the remarks made by Mr. Box upon the question of leakage, I confess I do not expect it to be much less than it is; and I do not know of any company in London, with an extent of mains anything like those of this company, where the leakage is less in proportion.

Mr. Brushfield: Allow me to second the resolution. I am quite sure that, not in this room only, but in the whole gas world, it will be felt that no gentleman better deserves the thanks of a body of proprietors than Mr. Gray. If we are to judge of the sack by the sample, our directors as a board are fully entitled to our thanks and confidence. (Hear, hear.) I, for one, feel deeply indebted to them for the manner in which they have discharged their duty, and have much pleasure in seconding the motion.

The motion was very cordially adopted.

The Chairman: Gentlemen, in the name of myself and colleagues, I can assure you we are much gratified by this flattering vote. I need not say that, so long as we enjoy your confidence, we shall do everything in our power to meet your approval.

Mr. Ward moved—"That the thanks of the meeting be given to the auditors for their attention to the company's accounts during the past half year."

Mr. Lynn seconded the motion, which was unanimously adopted.

Mr. Prior acknowledged the vote. He said: For the kind way in which you have received the proposition, we feel extremely obliged. I will only say that we have examined your accounts most carefully, and have found them correct in every particular. It is very gratifying to us to have such accounts to present to the proprietors; and I can only hope that the next time we audit them they may show even more satisfactory results.

The proceedings then terminated.

## METROPOLIS GAS SUPPLY.

### Wandsworth District Board, Wednesday, July 30.

Mr. Tolcher moved, in accordance with his notice of motion—"That this board being desirous of affording facilities to Mr. Beaumont as gas-examiner, for the satisfactory discharge of the duties of his office, especially for ascertaining the quantity of gas consumed by the public lamps throughout the districts, directs that he be authorized to procure four additional meters." He said that although the board negatived his proposition at the last meeting, yet he thought it had been decided without full consideration. He was out a few nights since, and saw Mr. Beaumont making experiments with two meters only, when he could have as easily attended to four more. It was well known that he was not one who supported the appointment of Mr. Beaumont; yet he having been elected, the board ought to let him have all the appliances to carry out his experiments, so that they might derive the full benefit of the £30 that he was to receive.

Mr. Barringer seconded the motion, observing that, although he did not believe any good would result from the appointment, yet Mr. Beaumont having been appointed, the board were bound to assist him in carrying out the experiments he was making.

Mr. Carpmael opposed the motion, arguing that for the experiments to be of any value, the person making them could not properly attend to six lamps sixty yards apart.

The motion, upon a division, was carried by fourteen votes against eleven.

Mr. Beaumont then read his report. It stated that the supply of the Phœnix Company was improving, and during the past fortnight it had been almost free from ammonia. On the 25th of July, the illuminating power was 14·4 candles in Kennington Lane; and, on the 28th, 13·36 at Wellington Street. With respect to the complaint of Messrs. Lee and Hare, as to the defective light to the public lamps in Putney, he believed that the complaint arose from the smallness of the main, which was now being enlarged. The gas supplied by the Wandsworth and Brentford Companies were both stated in the report to be foul. From the want of a photometer, he could not report the illuminating power of the gas supplied by these companies.

Received.

### St. Olave's District Board of Works, Tuesday, Aug. 5.

The Gas Committee further reported as to their correspondence with the Surrey Consumers Gas Company in reference to the lighting of the district by meter. They had informed the company that the board were prepared to offer them 3s. 3d. per 1000 feet for the gas consumed, a meter to be affixed to every twelfth lamp. This offer was declined, but the company offered to reduce their price from 4s. 6d. to 4s., making, as a pretext, the provision that the accounts of the board should be settled within one month after they fell due. The account then owing was paid, and the company's offer declined. As the contract expired at Midsummer, the committee, fearing that the district might be put in darkness, arranged with the company to continue it until Michaelmas next. The committee again considered the subject, and offered 3s. 6d. per 1000 feet, one meter to be affixed to every twelfth lamp. This offer was also rejected, thus leaving arbitration as the only remaining course to be adopted. It appeared that the company had fixed the charge of 4s. as the lowest price mentioned in the 37th section of the Metropolis Gas Act to be charged to private consumers not under special contract. The board, however, should be put on a different footing to private consumers, as it was the largest consumer in the district, and there was neither expense nor risk in collecting its accounts. The company said there was nothing to refer to arbitration, as the lowest price mentioned in the Act had been offered by them and a meter required to be placed to each lamp. If this were so, there was but little use in the Act providing for an arbitrator being appointed, but the committee did not think such to be the case; and they recommended that the subject should be referred back to the committee to arrange for the settlement of the question by arbitration, and that they be empowered to employ counsel and call witnesses, &c.

Mr. Walker said the proceedings of that board had been noticed by the press, and to this he did not object so long as facts were fairly represented. The Journal of Gas Lighting was a valuable publication; and about four weeks since, there was inserted in its columns a verbatim copy of a report of one of their meetings as it appeared in the *South London Journal*. It was a very fair report, as the reports generally were in that paper. It was short, but to the purpose, and without misrepresentations. After that, a letter appeared in the Journal of Gas Lighting full of misrepresentations; and it behoved him to point this out, through the medium of the same paper as they had already borrowed from, and, if they had honesty, they would give it the same publicity as they had given to the former extract. The first statement in the letter was erroneous, for the board had not, as stated, followed in the footsteps of the City in this matter, but had moved in it before they had. Again, it was affirmed that St. Olave's lighted their lamps before any other locality, and extinguished them later; but this he denied, and pointed out that the gas company had never complained of it. If their servants had been guilty of doing as had been stated, the board would have checked them, and the company would have been sure to have told them of it. The letter then went on to say that the board having, under Mr. Croll, lighted and extinguished their own lamps, the company, on taking the management of their affairs into their own hands, gave notice to the board that unless they burned by meter, the company would have to take the control and management of the lamps into their own hands. This was a misrepresentation, for it was the board that, on the contract expiring, applied to have the gas supplied by meter, on the company refusing to supply gas for less than £4. 15s. per lamp per annum, whether the board or the company lighted or extinguished the lamps. This burning by meter was the whole gist of the question between the board and the company. He then, in dismissing this subject, strongly denounced an anonymous letter, containing such misrepresentations, being admitted into the columns of a respectable journal. In speaking of the report, he said the committee, as well as the company, was desirous of having every foot of gas measured; but, to do this, a meter was not required for each lamp. Such a proposition was shown to be untenable, from inquiries made by the committee, and even in their own district gas was being burned with only one meter to regulate the consumption of several lamps. Even if they must put a meter to every lamp, he would still say, "burn by meter." The company had reduced their price from 4s. 6d. to 4s., and the committee had advanced their offer from 3s. 3d. to 3s. 6d. Gas could now be made cheaper than when the company supplied gas at £3. 5s. per lamp, as they must deduct 15s. from the charge of £4 for lighting, &c., and yet they wanted to charge 4d. per 1000 feet, placing the board on the level of the smallest consumers. The board was the largest consumer in the district, and, in arbitration, it would come out what the railway companies were paying. Gas could be made for 2s. 6d., but the board only wanted what was right and fair. When the company supplied the gas, and lighted and extinguished the lamps for £4 per annum, they paid £400 or £500 per year for breaking up the roads. Now, there was nothing of this, nor any competition to take away their customers, and the private as well as the public consumers should have some of the benefits, then, accruing to the company, just as there had been a reduction in the price charged by the adjacent companies. The questions to be referred to arbitration were as to the meterage and price of gas. He moved the adoption of the report.

Mr. Sard seconded the motion, feeling satisfied, from Mr. Walker's arguments, that the course proposed was the one that should be adopted.

Mr. Cameron thought the company was trying to get more out of the consumers than they ought to, and he would therefore vote for the report. He hoped the question would be referred back to the committee, as they had hitherto so well managed this matter.

The motion was then carried unanimously.

## METROPOLITAN BOARD OF WORKS.

### Friday, August 1, 1862.

#### PROPOSED CONSTRUCTION OF SUBWAYS.

At the Weekly Meeting of the Metropolitan Board of Works to-day—Mr. Le Breton in the chair,

Mr. Carpmael submitted the following motion, of which he had given notice—"That it be an instruction to the solicitor to prepare a bill with a view to this board obtaining like parliamentary powers in regard to the construction of subways in the metropolis, for the reception of water and gas-pipes, and electric-telegraph conductors, which the board now possess in respect to the construction of sewers, and that the cost of such works be made a charge on the coal and wine-dues. Also, powers to regulate the use by water, gas, and telegraph companies of the subways already, and hereafter to be constructed by this board, and for preventing streets and footpaths being broken up, without the consent in writing of this board, where subways shall have been constructed." He said that as the question of subways had been brought under the notice of the board on former occasions, it would not be necessary on his part to dilate at any great length upon the subject at present. The board were aware that, with the view of obtaining the necessary powers for making new streets, a right was included in the bill for making a subway in respect to the construction of sewers. The Act of Parliament, then, having made it incumbent on them to make a subway, they were now authorized to deal with the question in a more general manner, and to seek for an extension of their powers, because, although they had the right already to which he referred, they had no power to prevent water, gas, and telegraph companies from breaking up the streets. The desirability of having subways generally in the metropolis would, he was sure, be obvious to all the members of the board. No other plan, he believed, would more effectually relieve many portions of the highways. The constant breaking up of the streets not only caused an enormous outlay, but it entailed a very large expense on every district where the breaking up took place. That the subways, then, throughout the metropolis were desirable, there was no doubt whatever. That the making of them must necessarily occupy a very long period of time, he was willing freely to admit; but then, he contended that there was a duty imposed upon the board to make a commencement of the work at the very earliest possible period. He was willing also to grant that a reasonable opportunity for dealing with the general principles of the question had not presented itself to the board

before the present time, but that time had now arrived. There was a time for all things; and he believed with the great poet who said—

"There is a tide in the affairs of men,
Which taken at the flood leads on to fortune."

The present moment, too, was auspicious, because the board stood favourably in the estimation of Parliament and of the metropolis; in fact, Parliament had fully recognized them as the Metropolitan Board of Works. Under these circumstances, he thought they might safely go to the House of Commons and ask for the necessary powers, basing their argument upon the indisputable fact that the making of subways in highways was a matter of very considerable public importance. There were already very many Acts of Parliament which permitted gas and water companies to break up the streets. The companies no doubt fancied that, by making the necessary restoration, and paying any amount of cost they liked, they did all that lay in their power to cure the evil, but that furnished very little reparation so far as the general public were concerned. If there were subways to a large extent in London, the board would be in a position to render essential service. In the first place, the present enormous expense would not have to be incurred. Then, there would be none of that constant inconvenience to the public which was caused by the breaking up, repairing, and relaying of roads. All these matters would be saved. What was necessary, then, to be done, was this:—the board should call upon their solicitor to prepare a bill. Having prepared it according to the best information in their power—having got something like a bill to meet the case, then the wisest course for them to pursue would be to communicate a copy of that bill to all the gas and water-companies in the metropolis, in order, if possible, to obtain the co-operation of those companies; because, without their co-operation, it would be next to impossible to hope that Parliament would confer upon the board the necessary powers. Upon the other hand, if the board went for those powers with the concurrence of the companies in question, then it might fairly be expected that they would get the bill passed at the earliest possible period. The board, in his opinion, ought to seek for powers to have the regulation of the subways; and then they ought to state in the bill under what circumstances the different companies might use the cubical contents of those subways. These, however, would be matters which would be best ascertained at the time when the board came to communicate with the companies; and another point which would then have to be discussed and settled would be the amount which it would be reasonable to charge the companies for the occupation of the subways. He apprehended no serious difficulty in the arrangement of these details, provided they should succeed in obtaining co-operation between the board and the companies; but, with that co-operation, they might go with confidence to Parliament, and ask for the necessary powers. Of course, if they got the necessary powers, when a road was broken up for repavement, they would make the subway, and execute the necessary repairs to the roadway in the best possible manner. There were a variety of other observations he might make upon the subject, but he felt that it was unnecessary to do so, inasmuch as the question had been frequently considered for a length of time past by the board; and, besides, the trial they had had of the subway already laid down in Covent Garden was so satisfactory as to recommend itself to their general approval. There was only one variation which he proposed to make in his motion, and that was at the close of the first paragraph, where it said that "the costs of such works should be made a charge on the coal and wine-dues." He wished now to add, "or such other fund as Parliament may direct." He had already alluded to the meaning of the second paragraph of the motion—viz., that, at present, gas, water, and electric-telegraph companies might break up any part of the streets, to lay their pipes and wires, and that the board had now power to interfere with them; but, if the second paragraph of the motion were carried out, and the subways constructed, then these companies would be prevented from breaking up the streets and footpaths without the consent in writing of the board. This was a right which, if the subways were constructed, it was very probable the companies would cease to exercise, if for no other reason but this, that the public were very adverse to the breaking up of the lines of thoroughfare. That the right now existed in the companies to an unrestrained extent, there could be no manner of doubt; but, when the board, under the proposed bill, should be placed in a position to prevent the streets from being broken up, then it might fairly be presumed that a better feeling would exist between the public and the companies than was now the case. There was only one other matter which he should take the liberty of mentioning. He had been led to complain on a former occasion of a want of aid and assistance on the part of the metropolitan Members of Parliament when matters promoted by the board were before the House of Commons. Now, as these metropolitan Members were returned by the same constituencies as those which returned the members of the Metropolitan Board of Works, it was on all hands highly desirable that cordiality and good feeling should exist between all these members. It had been heretofore very properly suggested that the board should ask for the assistance of the Members for the metropolis, and inform them, at the same time, that, if they had any new matter to suggest as alterations in the provisions of the bills promoted by the board, they might send it in, and it would be duly considered, and, if approved of, adopted. This was a suggestion of which he approved; and, therefore, when the proposed bill was prepared by the solicitor, he would ask the board to endeavour to do all in their power to render it successful, by obtaining the assistance of the metropolitan Members of Parliament—assistance which, in such a case, might be rendered most useful and serviceable, because it would be given in support of a measure that could not fail to be of great practical benefit to the metropolis.

Mr. FEW seconded the motion.

Mr. DIXON said that, although he did not disagree entirely with what Mr. Carpmael had stated, yet he wished that that gentleman should not have altogether taken upon himself the paternity of the little child, which, in reality, he (Mr. Dixon) had brought forward and produced to the world years ago himself. The introduction of the bantling now, in such a shape as it had been originally presented, was a very sorry specimen of its first proportions. As to one part of the present project—that of making the costs of the works chargeable upon the coal and wine-dues—he (Mr. Dickson) sincerely hoped that that would not be for a moment attempted. Years since, he had advocated the necessity of having subways constructed. He had done so at that time in terms of a very strong and forcible character, although he had not thought it necessary then to speak on the subject at one-tenth part of the length which his friend, Mr. Carpmael, had occupied on the present occasion. There was no doubt whatever, he was willing to admit, that the making of these subways would be a highly important object so far as the metropolis was concerned, but he could not disguise from himself the fact, neither did he wish to suppress it from the board, that there were many difficulties surrounding the carrying out of that very desirable project. For instance, some persons would still put forward a right to go to the centre of the streets.

The CHAIRMAN: That cannot be done.

Mr. DIXON was willing to admit that it could not be done, yet still the right would be asserted. He candidly repeated that, if the object could be carried out, it would doubtless be very important; but, in order to do so, he thought that any Act of Parliament upon such a subject should be referred, not to the solicitor in the first instance, but to a committee, carefully and calmly to consider its provisions. If that were proposed, he should support the motion, but certainly he should dissent from the proposition in its present shape. Something had been said with reference to the gas, water, and telegraph companies. All he could say with regard to them was this—that, judging from the correspondence he had had with them, he was convinced that they were most anxiously in favour of the construction of subways. Their representations were very distinct. They stated that they were losers to the extent of 23 per cent. of gas every year by the present system, and that there would be an immense saving effected to them if subways were constructed, and if they were thus enabled to find out more readily and inexpensively where the escape of gas was occasioned. He hoped the time would yet arrive when the money saved by the sewage would meet the whole of the expense of the subways; but, at all events, he placed no reliance at present upon the costs being defrayed by the coal-dues.

The CHAIRMAN observed that, with the exception of the metropolitan area, all other portions of the metropolitan district were excluded from the operation of the coal-dues.

Mr. DIXON again expressed a hope that the question of the costs would be left entirely in the hands of a committee.

Mr. LEGG moved—"That it be an instruction to a special committee, to be appointed for the purpose, with the assistance of the Streets Committee, to consider the best manner in which the cost of such works should be defrayed."

Mr. HALL agreed with the last speaker, that there should be a conjunction of committees on a subject so important.

Mr. WILKINSON was of opinion that the board should have a consultation with Government before they proceeded to legislate upon a subject of such gigantic importance. He would suggest that, instead of an instruction being given to the solicitor to prepare a bill, there should be a sub-committee of the whole board appointed to consider the question in all its bearings.

Mr. PHILLIPS expressed the gratification he felt at seeing Mr. Carpmael interfering with a view to bring this subject into something like legislative shape. At the same time, he feared that the board were not in a position to prepare a bill upon the subject. What grounds had they? They had no power at present in their hands for testing the efficacy of a subway. Their first attempt, so far as a subway was concerned, was confessedly an experiment. It was a very small specimen indeed, and by no means adequate to furnish them with the necessary results by which to decide. He, therefore, asserted, broadly, boldly, and unmistakeably, that they were not now in a position to deal with a matter of this important character, and to prepare a bill upon the subject for the consideration of the Legislature. At the same time, he quite admitted the value of the suggestion, and hoped to see the time arrive when the board should in reality be able to carry out subways throughout the whole metropolis. There was no doubt in his mind that, if those subways could be constructed, and the pipes of the various companies laid through them, there would be not only an immense amount of difficulty saved, but also a vast quantity of gas and water; but then, notwithstanding the great benefits they might confer on the community in many respects, great care would have to be taken that they did not cause disastrous calamities in others. Upon this latter subject the board were not now capable of deciding upon any positive information in their possession. He thought, therefore, they ought to refer the matter to a committee. Nay more, he was of opinion that they ought to wait another session—another year—in order to obtain further information, and to test the matter fully, because at the expiration of that time they might be able, which they were not now, to take in hand the construction of subways generally with some credit for having experience upon the subject. He should vote against the present proposition altogether, not only because he thought the board incompetent from their present position to legislate upon the subject, but because also he disapproved of the mode suggested for meeting the question of cost.

Mr. WILKINSON suggested that the proposition should be altered to the following effect:—"That it be referred to the Streets Committee to consider the propriety of introducing a bill upon the subject."

Mr. CARPMAEL intimated that he had no objection to this latter alteration. His simple object in proposing his motion was this—to place upon record that it was the duty of the board at the earliest possible period of time to deal with the matter of these subways. He wished that dealing to be done at once in order that they might, at all events, break ground, if they did nothing besides. He asked the board to deal with the question in the best manner it considered most desirable. He was not tied to any proposition in particular, and would be perfectly satisfied to adopt any suggestion which would effect the desired object he had in view.

The amendment of Mr. Wilkinson was here put and carried.

Mr. CARPMAEL, in reply to what had fallen from Mr. Dixon, said, that the latter gentleman was under a mistake respecting the subway movement, inasmuch as Mr. Wright, the late member for Westminster, and he (Mr. Carpmael) had dealt with the subject so far back as 1856. The honour of its paternity was not, therefore, to be taken from them by Mr. Dixon.

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### FRIDAY, AUGUST 8.

#### THE EMBANKMENT OF THE THAMES.

At the Meeting of the Board this day—Mr. WILKINSON in the chair,

Deputy HARRISON, in pursuance of notice, moved—"That a committee of the whole board be appointed, to consider what steps it will be necessary at once to take, for the purpose of putting in force the provisions of the Thames Embankment Act, 1862." He said he was unwilling, from any confidence which the board might repose in him to name the executive committee who should carry out this important work, while, at the same time, he was anxious that immediate measures should be taken to put the Act in force. He had looked to the formation of the committees which they already possessed; but, under the Thames Embankment Act, the board could use their discretion in giving the management of the whole or any portion of the work to any committee which they might think proper to appoint. Since he had given notice of his resolution, he had found that some of the members fancied one mode of proceeding and some another in carrying out this matter; but, it was his opinion, that questions of this nature could be most conveniently discussed in a committee. All that he wanted was a free conference upon the subject, and that object he thought would be secured by the adoption of the resolution.

Mr. ROBINSON seconded the motion.

Mr. FREEMAN moved as an amendment—"That the Thames Embankment Act be referred to a committee now to be appointed, with so much and so many of the powers and authorities and discretions by this Act given to and reposed in the board, as the board shall think fit or proper to delegate to such committee; and that such committee, upon their appointment, be authorized to put in force the powers in the aforesaid Act." He referred to the working

of the main drainage committee, and said that from his experience of the working of committees of the whole board, he thought this would be the best course to pursue.

Mr. ROBINSON objected to the amendment, beause it was necessary that some inquiry should be made before the board delegated its powers to any committee. Inquiry was wanted, and the object of the motion was to obtain that information through a preliminary committee.

Mr. DOULTON supported the amendment, and considered, if the deputy's motion were adopted, nothing would be done in the matter.

After a lengthened conversation, the board divided, and the numbers were 17 on either side.

The CHAIRMAN declined to give a casting vote, and said that his object in doing so was, that he did not like in that way to decide a question of such importance. The result of his refusal to vote would be, that the amendment would drop, but it could be moved again by the honourable member, or any other member.

Mr. DOULTON moved another amendment to the motion, but,

Mr. SMITH (the solicitor to the board), expressed an opinion that there would be some legal difficulties in carrying it out, if agreed to.

Mr. DOULTON thereupon withdrew it, and the original motion was agreed to unanimously.

Mr. CARPMAEL then moved—"That it be an instruction to the engineer of this board, to prepare plans and specifications of the works necessary for the construction of an embankment on the north side of the Thames, between Blackfriars and Westminster Bridges, and for the construction of part of the low-level sewer therein, in order that tenders may be obtained at the earliest period for the execution of such works."

Mr. ROBINSON seconded the motion, which was agreed to.

Mr. CARPMAEL further moved—"That it be an instruction to the engineer of this board, to prepare a model of the area which is on the north side of the river Thames, and is bounded on the east by Wellington Street, on the north by the Strand, and on the west by Parliament Street, showing the positions and the gradients of the new streets (proposed by the Act of Parliament which has just passed) leading to and from the embankment on the north side of the Thames, between Blackfriars and Westminster Bridges."

The motion, after a great deal of conversation, was agreed to.

Mr. DOULTON called the attention of the board to the report of the royal commission on an embankment for the south side of the river, and moved—"That it be referred to the Main Drainage Committee, to consider the course which this board ought to pursue in reference thereto." It was a question whether Mr. Cowper would become the promoter of that bill; and, therefore, the board ought to take the matter up at once, in order to get an Act of Parliament next session.

Mr. CARPMAEL seconded the motion, which was agreed to.

## BALLOON ASCENT, FOR SCIENTIFIC PURPOSES, FROM WOLVERHAMPTON.

On Thursday morning, the 17th ult., a second balloon ascent was accomplished in this town, by the Balloon Committee of the British Association for the Advancement of Science, the object being to make scientific observations on various atmospheric phenomena, at different heights. The last ascent, which took place in March, failed through the unfitness of the balloon for its purpose, and its being too small, whereupon the committee entered into arrangements with Mr. Coxwell to construct a new balloon, capable of containing sufficient gas to ascend a distance of five miles, at which altitude the committee desired that scientific observations should be made. Mr. Coxwell accordingly constructed, of American cloth—not of silk, a material now little used for such purposes—a gigantic balloon, said to be the largest ever formed, either in this country or on the Continent, being large enough to receive 90,000 cubic feet of gas. In the meantime, Mr. Proud, the engineer to the gas company, who has distinguished himself by the warmth with which he has thrown himself into the objects of the committee, set himself the task of preparing a very light description of gas, when charged with which the balloon would necessarily be more buoyant than if it were to be inflated by means of the ordinary gas. Each day, for some weeks, Mr. Proud stored, in one of the large gasometers of the Stratford Road Works, the gas manufactured at that particular period when the "make" is of less specific gravity than that which proceeds from the retorts at other times, and at length he had collected a large supply of the specific gravity of between 380 and 280, as compared with the atmosphere at 1000. But the second expedition was long delayed, in consequence of the unsuitability of the weather, and an unfortunate accident which happened to the new balloon a few weeks ago, inducing greater caution on the part of those concerned in the selection of the time for renewing the experiment. The balloon had been repaired, and was in readiness for a recommencement of operations on Monday week, when Dr. Lee, one of the committee, and Mr. Glaisher, of the Royal Observatory at Greenwich (the latter of whom had undertaken to make the observations), came from London, in the hope that the weather would favour their design. It was desired to make an ascent on Monday night, but the wind, too boisterous, baffled the hopes entertained; and the following morning was then fixed upon, and about 3000 feet of gas were allowed to flow into the balloon—only, however, to be wasted, for the wind gave rise to despair of an ascent being made with any degree of safety that day. At length, Thursday morning promising a calm and bright day, the work of inflating the balloon was begun at an early hour, and was completed at nine o'clock.

The ascent took place precisely at 9.43; and, as the balloon left the earth, amidst the cheers of the spectators, mutual congratulations were exchanged between the occupants of the car and several gentlemen among the spectators to whom they were known. The balloon remained in sight by the naked eye about ten minutes, when it penetrated a small cloud, and, on emerging, the sight presented was really glorious. The sun shone and exhibited the balloon in all the gracefulness of its form, and all the richness of its orange colour, between two fleecy clouds, but the view was of but very short duration. The balloon entered the second cloud, and was not seen again.

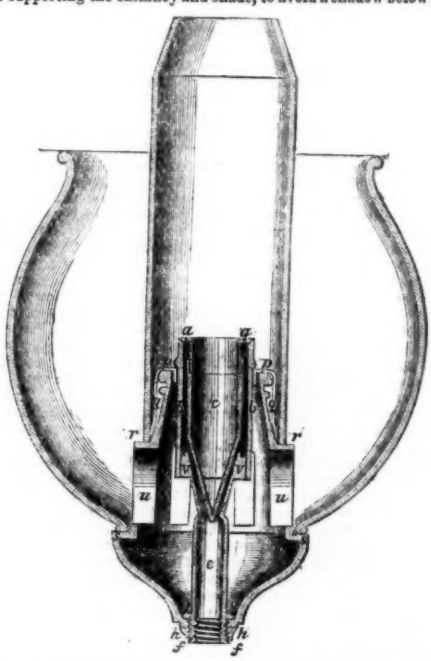
The descent was effected about noon, Mr. Coxwell having ascertained that they were approaching the Wash; it was effected, too, with great, indeed dangerous rapidity, owing, we understand, to the intense cold which prevailed in the upper regions. The instruments were considerably damaged, but not so much so as to be incapable of repair.

From the records of the journey preserved by Mr. Glaisher, it appears that the undertaking was fraught with a large amount of interest, not only to the scientific world, but even to those who have never entered on the field of meteorological science. When the ascent was made, the barometer registered 29.50, and the temperature stood at 55°. In four minutes, the voyagers found the temperature to be 45°, the air being dry. The temperature afterwards so rapidly decreased, that at two minutes after ten, when the sun was shining brilliantly on the balloon, the thermometer stood at 26°. Mr. Glaisher remarks that, about this time, the balloon being supposed to have attained a height of about two miles, they heard a band of music, and looking downwards obtained a picturesque view of the earth. The fields, he says, looked like a tesselated pavement, possessing a combination of beautiful colours, and the roads were as clearly defined as though the observers had been but a little height over them. The next change observed was an increase in the temperature to 31°, and at a quarter past ten the mercury had risen to 37°. On starting, Mr. Coxwell's pulse was beating at 75, and Mr. Glaisher's at 76; but, at this time Mr. Coxwell's had risen to 86, and Mr. Glaisher's to nearly 100. The gas, too, which had been opaque, became perfectly transparent, and, the neck being open, Mr. Glaisher could see through the gas to the top of the balloon. Its proportions were observed to be accurate, and the netting clung tightly around it. A striking change was observed in the surrounding scenery. The sky, instead of being pale light blue in colour, was now an intensely deep Prussian blue. The cumuli clouds far below were very rocky in appearance, and the sun was shining upon their surface. The *strati* clouds read 16 inches; and the temperature, which had continued slowly to increase, was 38° at 10.30. Now, the barometer was reading less than 15 inches, showing that the nëronauts were nearly four miles high. The palpitation of the heart was very perceptible, so much so that each man could hear the beating in the breast of the other. The ticking, too, of Mr. Glaisher's watch was remarkably loud, reverberating like a chronometer beating upon a sounding-board; and the rustling caused by turning over the leaves of his note-book appeared like the rushing of a high wind. At 10.35, the temperature had increased to 42°, and they had attained a height of quite 4 miles. The air was very dry. A peculiar feature was at this time remarked: the hands were dark blue, and the lips also blue, but not the face, the circumstance being accounted for by the atmosphere containing but a small amount of oxygen. Now the temperature began to decrease with wonderful rapidity. In four minutes, it was reduced to 36°, and by 10.47, it was down to 31°. At 11.1, the highest elevation was reached, the barometer a little above 11 inches, and it was evident that the voyagers had ascended to very nearly five miles. Here the temperature was 16°, or just as many degrees below the freezing point; and the breathing, which was observed to be interfered with, when heart-palpitation commenced, again became affected. A deep blue sky was to be seen at this point, with clouds below, and the cold was felt severely. At 10.57, a feeling of sea-sickness came over Mr. Glaisher, and at 11.7, the same feeling returned, but it was not so prolonged in duration. Mr. Glaisher had been warned that at this height blood would issue from the nose; that the eyes would be affected, and there would be a tingling in the ears; but neither in the case of Mr. Coxwell nor in his own case were either of these manifestations perceived. Mr. Coxwell only found it necessary to put on one additional coat while they were up; and Mr. Glaisher wrapped a cloak round him, but soon threw it off. The fingers were not benumbed, nor were either of the voyagers uncomfortably cold. When they were between three and four miles high, Mr. Glaisher suggested that the balloon should make its first "dip," Mr. Glaisher desiring, in order to check his experiments, to descend to the earth two or three times before making his final ascent to the highest altitude; but Mr. Coxwell having felt certain that they were going too near to the Wash to enable them, if they made a dip, to attain the height desired and descend before touching upon the sea, the attempt was abandoned, and the ascent to the highest elevation was made at once.

It should be remarked that the air was dry throughout the journey. At the highest elevation, it was 18° below the freezing point. No dew was deposited. The dry bulb thermometer read 16°, and the wet bulb 9°. Regnault's hygrometer at zero exhibited no dew, nor had Daniel's hygrometer any dew at 8° below zero. No dew could be deposited at this elevation at either of the hygrometers. The descent was resolved upon at 11.42, and when the voyagers were above the clouds the earth was visible, and the Wash could be seen in the distance. In descending, the shadow of the balloon was seen on the clouds, and it continued to increase as the clouds were neared. In passing through the clouds, the balloon could not be seen from the car, so intense was the darkness which prevailed.

## MONIER'S IMPROVED ARGAND GAS-BURNER.

The annexed cut illustrates an improvement in the argand burner, invented by Hippolyte Monier, of Paris, and consists partly in a substitution of an incorrodible refractory substance, which is a slow conductor of heat for metal, in certain parts of the burner, and partly in the employment of a glass basket for supporting the chimney and shade, to avoid a shadow below the lamp.



The piece, *a*, is a short tube, with a flange at its upper extremity, perforated with holes, from which the gas issues; this flange being beveled, as shown. In Monier's improvement, this tube is made of china clay, steatite, or other incorrodible refractory material which is a slow conductor of heat; *b* is a porcelain tube, forming the exterior of the burner, having its upper end beveled to fit the flange of the piece, *a*; *c* is a tube of metal, into which the tube of the piece, *a*, fits, and which combines with the latter tube to fit the tube of the burner. The tube, *c*, has a deep flange, *v*, at the bottom, to fit the interior of the tube, *b*; and it is made in the same piece with the hollow fork, *d d*, and hollow stem of the burner. The piece, *c d e f g*, being protected from the heat by the slow conducting nature of the substance composing the other two pieces, *c* may be made of lead, or other fusible metal, when cheapness is an object. The three pieces of which the burner is composed are united by a suitable cement; and the burner, thus constructed, presents essentially the same form as the ordinary argand gas-burner. The metal portion may be painted white, to harmonize in appearance with the tube, *b*.

The stem of the burner, besides the internal screw-thread, which screws on to the gas-pipe, has an external screw-thread, *f*, and a collar, *g*, above the thread. This is for the attachment of the glass basket that supports the chimney and shade; a nut, *h*, being screwed on below the basket. A washer of soft leather should be interposed between the collar and basket, to prevent the glass from breaking. The basket has a horizontal ledge, *s*, around its outer side, for the support of the shade; and projections above the ledge, *r*, to support the chimney. Between these projections are openings, *u u*, through the basket, for the admission of air; the air entering the shade at the top, and passing down by the side of the chimney, and thus being warmed in its passage. The chimney is steadied by the elastic arms, *q*, of the metal ring, *p*.

There are modifications of the basket proposed by the inventor, embracing, however, the same principle. For instance: the shade and chimney may both rest upon the same ledge, and the air may be admitted through holes below the ledge, and under the edge of the chimney, between the projections upon which it rests.

## THE LENOIR GAS-POWER ENGINE.

[From the *Annual Retrospect of Engineering and Architecture.*]

Much attention was drawn in the latter portion of 1860 to the method proposed by M. Lenoir, of Paris, for the purpose of obtaining power, in positions where steam-boilers could not be erected, by the expansion of the gases evolved by the combustion of ordinary coal-gas, when the latter was burnt in a receptacle specially constructed for the purpose. Many attempts had previously been made to secure this object before M. Lenoir undertook to solve the problem it involved, and, amongst others, the pumping machinery of the Croydon Canal may be cited; but they had all proved to be commercial failures, and of late years the attempt to derive power from this source had been abandoned. M. Lenoir's gas-engine was, however, presented to the world under the auspices of scientific men of such established reputation, that it inspired at once great confidence in the minds of the unprofessional world, and many engines upon this system were ordered in Paris. Practically, they have been found to be as unsuccessful as the more ancient machines of the same description, and have given rise to much ill-feeling, litigation, and loss; and, as M. Tresca has published, in the "*Annales du Conservatoire des Arts et Metiers*," a series of experiments on the actual working of Lenoir's gas-power engines, it may be desirable to notice them briefly, especially as they were conducted with great care and skill, and it is to be suspected with rather a favourable bias for the invention.

The machine experimented upon was made by M. Marinoni; it had a piston of 0·18 m. (7·08678 in.) diameter, and 0·10 m. (3·9371 in.) stroke, so that the area of the cylinder was equal to about 6·274482 ft. superficial, and the capacity was about 155·62 cub. in. In these engines, a portion of the stroke of the piston is used to draw into the cylinder definite proportions of atmospheric air and coal-gas, through certain orifices in the slides. When these orifices are closed by the movement of the slides, an electric spark causes the mixture of gas and air to explode, and increase of temperature more or less considerable is the result of this explosion, and of the combinations to which it gives rise; the heated gases thus acquire an increased pressure, and by its means they drive the piston to the end of its stroke. When the latter reverses its motion, the gases escape into the air, and the same effects as those before mentioned are reproduced on the other side of the piston, the machine having a double action, and the explosion being alternately produced on either side of the piston. The orifices of admission are so arranged as to cause the air and the gas to enter in parallel strata; and the escape of the burnt gases takes place through special orifices, on the opposite sides to the orifices of admission. In order to prevent the cylinder from becoming too hot, a current of water is allowed to circulate round it, and to pass off by a cock placed near the grease-cock. The explosion of the gases is effected by means of a Bunsen's battery of two elements; the wire is put in connexion through one of its poles with an isolated conductor, whose connexion with two plates of copper is established at the proper moment by means of a thin plate of the same metal working constantly against this conductor. This thin plate, and the wheel which carries it, follow the movement of the piston, and to some extent they form part of it. As to the two copper plates, they communicate respectively with two wires, terminating one in each chamber of the cylinder, at the inflamers. The latter are formed of platinum wire isolated in the axis of a bolt, by means of a porcelain tube, and of another wire of the same metal communicating through the button with the metal of the cylinder, which in its turn forms one of the poles of the circuit, whilst the other ends at the isolated wire. Directly contact is effected between the thin copper plate and the corresponding plate of the battery, the spark is given off from the two wires, and inflames the explosive mixture, and the various arrangements are so combined that the explosion shall take place when the piston has travelled over half the length of its stroke. In the experiments made on this machine by M. Tresca, the gas was measured by an ordinary stamped meter, a dynamometrical lever was applied to the engine to ascertain the power actually produced, and the number of revolutions of the first motion-wheel counted by a stop-watch.

The first experiments were carried on during 3 h. 32 m. consecutively, after allowing for stoppages, but the number of revolutions per minute varied very considerably; the extremes being 140 : 102, and the mean somewhere about 130 : 67. The length of the lever of the dynamometer was 4·1 ft., the load on the scale was about 5·51375 lbs., so that the effective work produced by the engine in the 60 seconds was equal to about 0·57 of a horse-power; in the period when the number of revolutions per minute was 129, the power exercised was only 0·56 of a horse. The consumption of gas, per horse-power per hour, when the engine was moving at the rate of 130·67 revolutions per hour, was 122·8 cub. ft.; at the slower rate the consumption was rather smaller, but M. Tresca assumed it to be, on the average, about 106 cub. ft. per horse-power per hour; the coal-gas formed about one-tenth part of the total volume of the explosive mixture, and it seemed to be entirely consumed. The water which circulated around the cylinder absorbed half the heat which was thus developed; the lubrication of the engine, it is als to be observed, required very great attention, and it gave rise to the cono sumption of a very large quantity of oil. Before the machine could be set a work, it was necessary to make the fly-wheel revolve several times; the speed of revolution, as was before said, was very irregular; and the non-explosion of a single admission of the gas was at any time sufficient to stop the machine. M. Marinoni thought that in practice it would be better to cause the explosion to take place a little before the gas passages were closed.

The second experiments were tried upon a machine made with extreme care, and having a cylinder of 9·45 in. diameter, and 4·72 in. stroke. The gas was passed from the main into a small holder, containing about 10·6 cub. ft., and thence through a meter registering within limits of error of 2 per cent. With this engine, the effective results were about equal to one horse-power, and the rate of consumption was, on the average, 97·12 cub. ft. per horse power per hour; but the proportion of gas to the atmospheric air in the explosive mixture was only about 0·075 in this instance. The greatest dynamical results per revolution seem to have been produced when they took place at the rate of 80 per minute; but the greatest aggregate result was obtained when the revolutions were at the rate of about 107 per minute. There were marked differences in the times of producing the explosion, and this irregularity was the most apparent on the side of the cylinder nearer to the main shaft of the engine. M. Tresca infers, from several facts which occurred in the course of his experiments, that there were some causes at work which retarded the transmission of the spark; and he considered that 100 revolutions per minute was the maximum number which was desirable. The pressure recorded was, at the maximum, 5·36 atmospheres; and the diagram drawn by the indicator showed that it sank very rapidly after passing the maximum point—a fact which may serve to explain the short stroke given to the piston; it also proves the necessity for paying great attention to the point of transmission of the spark. A series of very elaborate analyses of the gases resulting from the explosion was made under the superintendence of M. Boussingault, and from them it would appear that the combustion of the original gases is effected in a very perfect manner. The temperature in the cylinders was not less than 464° Fahr., that of the gas escaping was still about 308° Fahr., so that the consumption of water for the purpose of cooling the cylinder was at least 26·40 gals. per horse-power and per hour, or, in fact, about four times as much as would be required for the service of a high-pressure engine of the same power; a condensing-engine, however, would require about 3½ times as much water as the gas-engine. Possibly the water thus heated might be made to render some service, and thus to diminish the cost.

The latter important element in the commercial value of a source of power was estimated by M. Tresca, upon the basis of the prices paid in Paris, to be 0·832 fr. per horse-power and per hour; whilst the fuel required for a high-pressure steam-engine, burning 6·6 lbs. of coal per horse per hour, would be 0·12 fr.; and that required for a condensing-engine, burning 4 lbs. per horse-power per hour, would be only 0·072 fr. But, in addition to this, it is to be observed that the great heat of the cylinder burns the oil with such rapidity that a considerable additional expense is thereby caused, amounting to about 0·10 fr. per horse-power per hour, in the case of the second machine. The expense of the electrical battery is but small, and in this instance it was only 0·015 fr. per hour; a more serious inconvenience, however, consisted in the necessity for frequent examinations, cleansings, and repairs of the engine, and in the absolute necessity for employing workmen of the most intelligent and therefore costly description to direct its working. M. Tresca noticed that when the gas-engine was supplied directly from the main, it produced a very distinctly-marked effect upon the neighbouring lights; but that when a small holder was interposed, it was hardly possible to perceive any difference in their illuminating power. The capacity of the intermediate reservoir, according to M. Tresca, ought never to be less than in the proportion before mentioned—that is to say, of 10·6 cub. ft. per horse-power per hour.

M. Tresca concluded from his experiments, that although the cost of a horse-power per hour, by means of the gas-power engine of M. Lenoir, was very considerably greater than that of an ordinary steam-engine of the same power, there were still occasions in which the former might be very advantageously used. In many trades it is desirable to have at command a power which can be set instantaneously in action, and as instantaneously stopped. The gas-engine certainly possesses this advantage; and if in practice the vendors of those engines could, for any length of time, maintain the useful effects which M. Tresca was able to obtain from the engines sent to him for trial, they would have rendered great service to many of the minor branches of trade. Unfortunately, the French law-courts prove that this is not the case, and that the efficiency of the gas-power engines is rapidly destroyed. This source of power must, therefore, be classed still as one of the scientific toys of the age, in spite of the high promises which attended its inauguration.

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DR. J. NORTHCOTE VINEN'S REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY:—

| 1862. Week ending. | Number of Observations. | Maximum Light. Candles. | Minimum Light. Candles. | Average Light. Candles. |
|---|---|---|---|---|
| July 19 | 4 | 14·96 | 13·78 | 14·21 |
| „ 26 | 4 | 14·34 | 13·81 | 14·11 |
| Aug. 2 | 4 | 13·47 | 13·22 | 13·18 |

The volume of hydrocarbons averaged 4·33 per cent.; carbonic acid, 0·83 per cent.; sulphuretted hydrogen, none. There was a slight trace of ammonia on two or three occasions. The maximum pressure was 21-10ths, the minimum 6-10ths.

DR. HILLIER'S REPORT ON THE GAS SUPPLIED IN ST. PANCRAS.—During the month of July, the gas has been of better quality than in June. The average illuminating power was 13 candles—that is to say, that the gas burned by an argand burner of 15 holes and a 7-inch chimney, at the rate of 5 cubic feet, gave a light equal to 13 sperm candles, each burning at the rate of 2 grains per minute. On two occasions, the illuminating power fell to 1-10th of a candle below the standard—namely, to 11·9 candles. The highest result obtained was 13·6 candles. The burner used in my observations was a metal burner, with 15 holes, of moderate size, and not requiring any disc below to cut off the supply of air. On nine occasions, I found indications of ammonia, by means of test-paper applied for one minute to a current of the gas. On no occasion was there any trace of sulphuretted hydrogen. The pressure ranged from 6-10ths to 25-10ths of an inch.

THE PATENT LAWS.—A Royal Commission, consisting of Lord Stanley; Lord Overstone, Sir William Erle, Chief Justice of the Court of Common Pleas; Vice-Chancellor Sir William Page Wood; Sir William Atherton, Attorney-General; Sir H. M' C. Cairns; Horatio Waddington, Esq.; W. R. Grove, Esq., Q.C.; W. M. Hindmarch, Esq., Q.C.; W. E. Foster, Esq., M.P. for Bradford; and W. Fairbairn, Esq., C.E., has been appointed to inquire into the working of the law relating to letters patent for inventions.

# Share List of Water Companies.

*See "Share List of Gas Companies" for Gas and Water Companies.*

| No. of Shares issued. | Amount per Share. | Name of Company. | Amount paid up per Share. | Div. per Cent. per Annum. | Price per Share. |
|---|---|---|---|---|---|
| | | | £ s d | £ s d | £ s d |
| | | Airdrie and Coatbridge | | | |
| 588 | 1 | Alexandria, Dumb | 1 0 0 | | 0 2 6 |
| 800 | 25 | Ayr | 25 0 0 | 5 0 0 | 25 0 0 |
| | | Banbury | | | |
| | | Belper | | | |
| 4800 | 25 | Birmingham | 25 0 0 | 6 0 0 | 37 17 6 |
| 4800 | 25 | Do., new shares | 22 10 0 | 6 0 0 | 33 15 0 |
| 6000 | 10 | Blackburn | 10 0 0 | | |
| | | Boston | | | |
| | | Br. of Earn(L)£450 | | | |
| | | Brighton, Hove and Preston | | | |
| 8000 | 25 | Bristol | 25 0 0 | 1 8 0 | 13¾ to 14¼ |
| | | Do., preference | | | ¼ to 1 pm. |
| | | Broadstairs | | 4 0 0 | |
| | | Brompton and Gillingham | | | |
| 5000 | 10 | Bury and Radcliffe | 10 0 0 | 2 0 0 | 10 0 0 |
| 1333 | 15 | Do., pref. shares | 15 0 0 | 10 0 0 | 31 15 0 |
| 1333 | 18 | Do., do. | 6 0 0 | 10 0 0 | 14 0 0 |
| 2000 | 10 | Do., do. | 5 0 0 | 4 0 0 | 5 0 0 |
| 2000 | 10 | Do., do. | 1 0 0 | 4 0 0 | 5 0 0 |
| | | Cambridge | | | |
| 1500 | 20 | Cardiff | 20 0 0 | 7 10 0 | 29 to 13 |
| 1500 | 10 | Do. | 10 0 0 | 7 10 0 | 14¼ to 15 |
| | 10 | Carlisle | 10 0 0 | | 13 to 14 |
| | | Cheltenham | | | |
| | | Chepstow | | | |
| | | Chester | | | |
| 2485 | 2 | Clay Cross | 2 0 0 | 8 0 0 | 2 16 0 |
| | | Colchester | | | |
| 175 | 20 | Colne, Lancashire | 20 0 0 | 5 0 0 | 28 0 0 |
| | | Consett District | | | |
| | | Dartford | | | |
| 1250 | 20 | Darwen | 20 0 0 | 2 10 0 | 19 to 19½ |
| 1400 | 5 | Deal | 5 0 0 | 5 0 0 | 5 0 0 |
| 1481 | 25 | Derby | 25 0 0 | 7 10 0 | 50 0 0 |
| 400 | 50 | Dudley | 50 0 0 | 1 0 0 | 20 0 0 |
| 250 | 25 | Do., pref. shares | 25 0 0 | 4 10 0 | |
| | | Dukinfield | | | |
| 11600 | 10 | Dundee | 10 0 0 | 5 0 0 | 11 0 0 |
| 2670 | 5 | Dunfermline | 5 0 0 | 2 0 0 | 2 10 0 |
| | 5 | Durham | 5 0 0 | | |
| 7360 | 25 | Edinburgh | 25 0 0 | 5 0 0 | 28 0 0 |
| 7360 | 12½ | Do., new shares | 12 10 0 | 5 10 0 | 16 0 0 |
| 7218 | 6¼ | Do., do. ¼ shares | 6 5 0 | 5 0 0 | 7 0 0 |
| 5581 | 6¼ | Do., do. do. | 2 10 0 | 5 0 0 | 2 15 0 |
| 2000 | 25 | Exeter | 25 0 0 | 6 10 0 | 42 0 0 |
| | | Falmouth | | | |
| | | Folkestone | | | |
| | | Gosport | | | |
| | 20 | Gravesend&Milton | 20 0 0 | 3 0 0 | 14 to 16 |
| 1000 | 5 | Greenock (Shaw's Gravitation) | 50 0 0 | 7 0 0 | 68 to 70 |
| | | Guiseley, n. Leeds | | | |
| | | Harrowgate | | | |
| | | Heywood | | | |
| 1500 | 10 | Kilmarnock | 10 0 0 | 2 0 0 | 8 0 0 |
| 3200 | 25 | Leicester | 25 0 0 | 4 10 0 | 27 10 0 |
| 120 | 25 | Lewes | 25 0 0 | 6 0 0 | 26 0 0 |
| | | Limerick | | | |
| 720 | 25 | Lincoln | 25 0 0 | 7 0 0 | 32 0 0 |
| 360 | 25 | Do., new shares | 25 0 0 | 4 5 0 | 32 0 0 |
| | | **London Comps.—** | | | |
| 47000 | 10 | Berlin | 10 0 0 | 1 10 0 | 4⅜ to 5¼ |
| | 25 | Chelsea | 25 0 0 | 4 10 0 | 23 to 24 |
| | 25 | Do., new shares | 25 0 0 | 4 10 0 | 24 to 25 |
| | | Coln, Middlesex | | | |
| 975000 | Stk. | East London | Stock | 6 0 0 | 125 to 127 |
| 8000 | 50 | Grand Junction | 50 0 0 | 7 10 0 | 72 to 73 |
| 5840 | 25 | Do., half shares | 25 0 0 | 7 10 0 | 35½ to 36½ |
| 2310 | 100 | Kent | 100 0 0 | 5 0 0 | 102 to 104 |
| 1460 | 100 | Lambeth | 100 0 0 | 5 10 0 | 108 to 110 |
| 4120 | 50 | Do., new shares | 50 0 0 | 5 0 0 | 51½ to 53 |
| | | New River | | 441 6 8 | £17,400 |
| 1560 | 100 | New River London | | per sh. | |
| | | Bge. Annuities | 100 0 0 | 2 10 0 | 55 0 0 |
| 3036 | 100 | Southwark and Vauxhall | 100 0 0 | 6 0 0 | 123 to 125 |
| 3036 | 25 | Do., do. | 25 0 0 | 6 0 0 | 30¾ to 31¼ |
| 1265 | 100 | Do., do. | 10 0 0 | 6 0 0 | |
| 11064 | 61 | West Middlesex | 61 0 0 | 5 0 0 | 105 to 107 |
| | | | | per sh. | |
| | | Do., new shares | 6 2 0 | 4 0 0 | 9 to 9¼ |
| | | Liskeard | | | |
| | | Maidstone | | | |
| | | Margate | | | |
| | | Matlock | | | |
| 250007 | Sk. | Newcastle-on-Tyne (Whittle Dean) | Stock | 5 0 0 | 104 to 105 |
| 9600 | 6¼ | Do., do. | 5 0 0 | 5 0 0 | 5 to 5¼ |
| 155 | 20 | Newport, Carisbke. | 20 0 0 | 4 10 0 | 26 0 0 |
| | | Newport, Mon. | | | |
| | | Newry (L.) £6000 | | | |
| | | North Cheshire | | | |
| | 10 | North Shields | 10 0 0 | | 10 to 10¼ |
| | | Norwich | | | |
| 3600 | 50 | Nottingham | 50 0 0 | 5 0 0 | 60 10 0 |
| | | Pontypridd (Lim.) £3000 | | | |
| 8000 | 10 | Portsmouth | 10 0 0 | 5 0 0 | 11 7 6 |
| 400 | 5 | Ramsey, I. of Man | 5 0 0 | | |
| 1500 | 10 | Ramsgate | 10 0 0 | 6 0 0 | 13 to 13½ |
| | | Reading | | | |
| | | Richmond, Surrey | | | |
| | | Rochdale | | | |
| | | Rothesay(L.)£7000 | | | |
| | | Royston (L.) £2500 | | | |
| | | St. Helen's | | | |
| | | Scarborough | | | |
| | | Sheffield | | | |
| | | Shrewsbury | | | |
| | | Southport | | | |
| 11184 | 10 | South Staffords. | 10 0 0 | | 11 17 0 |
| 2554 | 10 | Do. | 5 0 0 | | |
| | | Spalding | | | |
| 21000 | 5 | Staffordshire Potteries | 5 0 0 | 6 0 0 | 7 5 0 |
| | | Stockport | | | |
| 1800 | 12½ | Stockton and Middlesborough | 12 10 0 | 6 0 0 | |
| 800 | 12½ | Do., A shares | 12 10 0 | 6 0 0 | |
| 1591 | 12½ | Do., B shares | 7 0 0 | 6 0 0 | |
| 4000 | 10 | Do., C preference | 2 0 0 | 5 0 0 | 2¾ to 3 |
| 25300 | 5 | Sunderland and South Shields | 5 0 0 | 8 0 0 | 8 10 0 |
| | | Tolcross, Lanark | | | |
| | | Tweedmouth (Lim.) £500 | | | |
| | | Wakefield | | | |
| | | Warrington | | | |
| | | Wellington, Salop | | | |
| | | Weston-sup-Mare | | | |
| | | Weymouth | | | |
| | | Winchester | | | |
| | | Wirral, Cheshire | | | |
| 20000 | 5 | Wolverhampton New Co. | 5 0 0 | 4 0 0 | 5 0 0 |
| 6000 | 10 | York New Co. | 10 0 0 | 5 0 0 | 11 12 6 |

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# Price Current.

## CASTINGS.—*Per Ton.*

*Average Weight of Cast-iron Gas-pipes, per Yard.*

| 1¼ in. | 2 in. | 2½ in. | 3 in | 4 in. | 5 in. | 6 in. | 7 in. | 8 in. | 9 in. | 10 in. | 12 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 21 | 28 | 33 | 51 | 70 | 89 | 107 | 126 | 149 | 177 | 208 lb. |

| Retail Prices are 5 to 10 per cent. higher. | London. | Glasgow. | Newcastle | Wales. | Yorkshire, Derbyshire, and Staffordshire. |
|---|---|---|---|---|---|
| | £. s. d. | £. s. d. | £. s. d. | £. s. d. | £. s. d. |
| Pig Iron, No. 1, G.M.B. | 3 5 0 | 2 13 6 | 2 15 0 | 3 0 0 | 3 5 0 |
| 1¼ and 2-inch Socket-pipes | 7 0 0 | 6 0 0 | 6 5 0 | 6 10 0 | 6 15 0 |
| 2½ and 3-inch ditto | 6 10 0 | 5 10 0 | 5 15 0 | 6 0 0 | 6 5 0 |
| 5 and 5-inch ditto | 6 0 0 | 5 0 0 | 5 5 0 | 5 10 0 | 5 15 0 |
| 6 inches and upwards ditto | 5 15 0 | 4 15 0 | 5 0 0 | 5 0 0 | 5 10 0 |
| Retorts, 1st fusion, hot blast | 5 10 0 | 4 10 0 | 4 15 0 | 5 0 0 | 5 5 0 |
| Ditto, 2nd ditto, cold ditto | 6 10 0 | 5 5 0 | 5 10 0 | 6 0 0 | 6 5 0 |
| Tank-plates, ¼ thick and above | 6 0 0 | 5 0 0 | 5 5 0 | 5 10 0 | 5 10 0 |

## WROUGHT-IRON TUBING,

*Subject to 40 per cent. Discount.*

| | 2 in. | 1½ in. | 1¼ in. | 1 in. | ¾ in. | ½ in. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Patent Welded Tubes, from 2 to 12 feet—per foot | 1 8 | 1 0 | 0 10 | 0 7 | 0 5 | 0 4½ |
| Ditto ditto, from 6 inches to 18 inches—each | 3 0 | 2 0 | 1 9 | 1 3 | 1 0 | 0 9 |
| Connecting-pieces, or Long Screws | 3 6 | 2 3 | 2 0 | 1 6 | 1 2 | 0 11 |
| Bends, Springs, and Elbows (wrought iron) | 3 9 | 2 3 | 1 9 | 1 0 | 0 10 | 0 8 |
| Tees, wrought or cast | 4 0 | 2 6 | 2 0 | 1 6 | 1 1 | 0 10 |
| Crosses, ditto | 4 6 | 3 0 | 2 6 | 2 0 | 1 6 | 1 2 |
| Iron Cocks | 17 6 | 9 6 | 7 6 | 4 6 | 3 3 | 2 6 |
| Ditto, with brass plug | 28 0 | 16 0 | 13 0 | 7 0 | 5 6 | 4 6 |
| Diminishing Sockets, Caps, Plugs, and Nipples | 1 3 | 0 9 | 0 8 | 0 6 | 0 5 | 0 4 |
| Plain Sockets | 1 9 | 0 8 | 0 7 | 0 5 | 0 4 | 0 3 |
| Syphons, 2-quart | 15 0 | 14 0 | 13 6 | 13 0 | 12 0 | — |

## COALS.—*Per Ton.*

| *Newcastle.—Unscreened.* | | *Scotch Cannel.* | |
|---|---|---|---|
| Whitwell Primrose | 6s. 9d. | Boghead (at Leith) | 45s. 0d. |
| Medomsley, Eighton Moor, and Burnhope | 7 0 | Kirkness, best | 23 0 |
| Pelaw | 7 3 | Capeldrae, 1st quality | 20 0 |
| New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth | 7 6 | Ditto, 2nd ditto | 12 6 |
| Pelton | 7 9 | Lesmahago (at Glasgow) | 25 0 |
| Ramsay's Newcastle Cannel | 16 0 | Ditto (at Leith) | 27 6 |
| | | Arniston | 27 6 |
| | | Wemyss | 20 0 |
| | | Knightswood | 18 0 |
| | | Pirnie | 14 0 |

## FREIGHTS.

| *Coastwise—Newcastle.—Per Ton.* | | *Foreign.—Per Keel.* | |
|---|---|---|---|
| Chatham and Rochester | 5s. 9d. | Barcelona | £25 0s. |
| Cork | 8 3 | Bordeaux | 16 10 |
| Dover and Folkestone 6s. 0d. to | 6 3 | Boulogne and Calais | 7 5 |
| Dublin | 8 9 | Cadiz | 14 0 |
| Exeter Quay | 8 0 | Cronstadt | 12 15 |
| Ipswich 5s. 4½d. to | 5 6 | Copenhagen | 9 10 |
| London (Pool) | 6 9 | Genoa | 24 0 |
| Lowestoft and Yarmouth | 4 9 | Hamburg 8s. 6d. to | 8 5 |
| Lynn | — | Havre de Grace | 9 7 6 |
| Portsmouth and Southmptn. 6s. 9d. to | 7 0 | Leghorn | 23 0 |
| Plymouth 7s. 3d. to | 7 9 | Lisbon £15. 5s. to | 15 10 |
| Shoreham | 6 6 | Rotterdam | 7 17 6 |
| Whitstable 6s. 0d. to | 6 3 | Stettin | 10 17 6 |
| Weymouth | 7 0 | Trieste and Venice £23. to | 26 0 |

## SUNDRIES.

| | | | |
|---|---|---|---|
| Best Newcastle Fire-bricks—per 1000 £2. 10s. to | £2 | 15s. | 0d. |
| Cliff's Fire-bricks (at Wortley)—per 1000 | 2 | 15 | 6 |
| Ingham's ditto (at Wortley)—per 1000 | 2 | 15 | 0 |
| Fire-clay Retorts—per foot run 8s. 6d. to | 0 | 7 | 0 |
| Tough Cake Copper—per ton | 93 | 0 | 0 |
| English Pig Lead—per ton | 19 | 15 | 0 |
| Welsh Bar Iron (in London)—per ton | 6 | 0 | 0 |
| Foreign Spelter—per ton | 17 | 17 | 6 |
| English Block Tin—per ton | 111 | 0 | 0 |
| Banca—per ton | 114 | 0 | 0 |
| Tarred Rope Yarn—per cwt. | 1 | 4 | 0 |

PETROLEUM.—For a considerable time past, the effluvium arising from petroleum has been a subject of local grievance in Liverpool, as it may possibly have been elsewhere. The unsavouriness of the odour has been pretty generally admitted, but its intensity, as well as its noxiousness, has been pointedly disputed. The subject was, among other matters of municipal interest, to be discussed at the last monthly meeting of the Liverpool Town Council. As fortune, or some other fortuitous cause, would dispose of such an affair, just as the town councillors were assembling, a man who was passing at the moment, carrying a jar of considerable size on his shoulders, by some unexplained accident, let it drop on the footpath. The jar was, of course, shivered, and the man, heartily ashamed of his awkwardness, ran away. The councillors who were in progress towards the municipal gathering were astonished—staggered—disgusted by the suffocating odour which was emitted from the broken jar, and all stood aghast at the unsavoury visitation. It was at once pronounced by some of the knowing ones that the contents of the broken jar had been petroleum. The intelligence spread; the previously-assembled councillors rushed out to satisfy themselves. To judge by the sudden application of the manual digits of the councillors to their nasal organs, the demonstration, though forcible, was anything but satisfactory, and each one was unexpectedly furnished—of course, by accident—with a practical knowledge of the scent peculiar to petroleum.

A NEW USE FOR CARBOLIC ACID.—Mr. J. E. Ashby writes from Enfield to the *Mechanics' Magazine* as follows:—Most persons have by this time heard that there is such a substance as carbolic acid; comparatively few have seen it; fewer still have used it; and no one (so far as I can find) has yet noticed a very remarkable property which it possesses in relation to practical mechanics. For the information of those to whom the substance itself is unknown, a word or two will be sufficient to introduce it to their notice. Carbolic acid is one of the products of the destructive distillation of coal, and till within a few years vast quantities of it were utterly wasted. When perfectly pure it is a white crystalline solid, which, by absorbing water, soon changes into a colourless refractive liquid, having a faint odour of roses and tar. It is not an acid in the popular sense, not being either sour or corrosive, and should therefore, perhaps, be generally designated by its other title of phenole. Crude carbolic acid may be obtained in bulk for about a shilling per gallon, and is a dark tarry liquid, containing, perhaps, from ten to twenty different substances in a state of mechanical admixture. Fortunately, this crude acid is available for the purposes to which I invite the attention of your readers. Just as oil is an anti-fractional liquid, so is phenole profractional; or, to state it more correctly, as oil appears to keep surfaces in motion asunder by interposing a thin film between them, so phenole appears to make them bite and bind, by bringing them into absolute contact (after a manner of speaking), and removing even the finest film from between them. Any one may convince himself of this by placing a little upon a perfectly clean and dry oil-stone, and then rubbing up the face of a broad chisel upon it. The sensation of the bite (I know of no other word to express it) is very curious, and renders any further explanation unnecessary. It seems as if the stone and the steel had absolutely nothing between them, or even as if they were positively brought together by some attractive force. I have applied this property of carbolic acid to the following operations—grinding, filing, boring, and sawing in metal—with great apparent advantage. When dissolved in fifteen parts by measure of methylated alcohol, it forms a milk-white emulsion if poured into water; and it may be worth while to ascertain whether such carbolated water would facilitate the ordinary work of the grindstone—a point on which I am not able to speak with certainty. If any of your readers should experience, as I did, much difficulty in obtaining the crude carbolic acid, I shall have much pleasure in indicating the source whence mine was derived, or in supplying any practical engineer with a sample so long as my little quantity holds out.

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**STOCKS TAPS, and DIES, GUN METAL GLAND-COCKS, WATER-GAUGES, &c.;**

**PATENT LAP-WELDED IRON TUBES,**

For Locomotive and Marine Boilers, &c.

**LONDON WAREHOUSE—No 66, QUEEN STREET, E.C.**

**PORTER AND CO.,**
GAS ENGINEERS AND CONTRACTORS,
LINCOLN;
AND 7, JOHN STREET, ADELPHI, LONDON, W.C.

ESTABLISHED 17 YEARS.

**OFFICE for the Procuration of** LETTERS PATENT, and the REGISTRATION of DESIGNS. JOSEPH WILLCOCK and Co., Patent Agents and Engineers, Successors to Messrs. Barlow and Co., 89, Chancery Lane, LONDON, W.C.

GRATIS, and post free, "THE INVENTOR'S MANUAL;" also a pamphlet, "*L'Obtention de Patentes Anglaises;*" 500 MECHANICAL MOVEMENTS; the first part of Kinematics, or the Transformation of Motion. By JOSEPH WILLCOCK, C.E., Mem. Soc. of Eng. May be had at the above address, and of any Bookseller. Price 2s. 6d. The second part is approaching completion, and will shortly be announced.

STOURBRIDGE FIRE-CLAY WORKS.

**E. BAKER and CO.**
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24 WHARF, HARROW ROAD, PADDINGTON, W.
Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
GARDEN EDGINGS, of various patterns.
BUFF and ORNAMENTAL TILES.
CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.
Shipments on the shortest notice.

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WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

**LEAKAGE OF GAS-MAINS**
AVOIDED BY COATING WITH
**YOUNG'S IRON PAINT.**
This Paint has been proved, by four years test, to stand all the purposes required in Gas-Works, and has the peculiar property of drying over work previously coated with Tar.
Manufactured by J. W. YOUNG, Neath, GLAMORGANSHIRE.
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PROPRIETORS OF
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MANUFACTURERS OF
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AMBLECOTE FIRE CLAY AND BRICK WORKS,
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*Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.*
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D's, 16×12, 15×14, 20×16, 16×18.

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**FIRE-BRICK AND TILE MERCHANTS,**
Wholesale and for Exportation,
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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
**GAS AND WATER WORKS.**

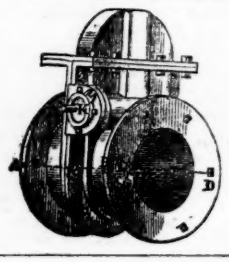
BELGIAN CLAY RETORTS.

**ALBERT KELLER, Ghent.**—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to ALBERT KELLER GHENT, will receive immediate attention.

**WEST and GREGSON, Gas-Meter**
MANUFACTURERS, &c.
UNION STREET, OLDHAM.
Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.
W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

**WALTER FORD,**
LATE
**PADDON and FORD,**
GAS-METER AND APPARATUS WORKS,
**GRAY'S INN ROAD, LONDON.**
MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.
A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.
Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

**F. & C. OSLER,**
45, OXFORD STREET, LONDON;
*Manufactory—Broad Street, Birmingham—Established* 1807,
MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.
ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.
THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.



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**IMPROVED GAS VALVES**
from 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter
List of prices, with full dimensions of all sizes up to 30 inches, to be had on application.
These Valves are all proved to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
Valves made with Outside Racks to order. Also, Screw Water-Valves with Gun-Metal Faces.
**BRYAN DONKIN & CO.,**
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**FIVE HUNDRED**
**HOLMAN'S PATENT DOUBLE-ACTION PUMPS**
Prove their general adaptation. They are adopted by
CIVIL, MARINE, MANUFACTURING, AND MECHANICAL ENGINEERS.
For Pumping TAR, AMMONIACAL LIQUOR, WATER, WORT, and other fluids, their intrinsic excellence is too well known to need description.
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Sole London Agent of the Williams's Perran Foundry Company, for the Sale of Cornish Pumping, Winding, and other Steam-Engines, heavy Machinery, Castings, and Forgings.
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**WALKERS GAS-VALVES**
HAVE BEEN
**DURING THE PAST TWENTY-FIVE YEARS,**
USED IN UPWARDS OF
**450 BRITISH and FOREIGN GAS-WORKS.**
They are made in the most SOLID, SUBSTANTIAL manner, with PLANED and SURFACED JOINTS, and SCRAPED SURFACES. They have a CLEAR, FULL BORE, in a STRAIGHT LINE of PIPE, and are TIGHT to PERFECTION.
Engineers are requested to insert "Valves of Walkers Manufacture" in their Specifications, by which they will be absolutely certain of the above important advantages. They can name the construction of Valve they prefer best, as Walkers make them of every description—either Walkers SCREW-VALVES, for the Gas-Works or for Street-Mains; INTERNAL RACK-VALVES; or the ORDINARY RACK and PINION-VALVES. REGULATING-VALVES, with INDICATING COLUMNS, &c.
Walkers London Manufactory is devoted entirely to the above class of work, of which their make is nearly double that of any other British house.

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A Gas-Valve of each kind can be seen in the above Class. HER MAJESTY'S COMMISSIONERS selected Walkers Valves for the LIGHTING OF THE BUILDING, and the PRESSURE and SUPPLY is governed by Walkers Regulating Indicating Column and Valve, which can be SEEN IN ACTION in the the Gas-Meter Room, Austrian Court.

**WALKERS DOUBLE-FACED WATER-VALVES**
Possess a most important practical improvement on the Stuffing-Box, effecting a large saving in a Water-Works Company's expenses. They are made with Four Gun-Metal Faces, scraped Surfaces, Gun-Metal Screws and Nuts, and are proved to three hundred pounds on the square inch.
IMPROVED DOUBLE-FACED HYDRANTS, &c.
Drawings and Prices on Application.
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# THE NEW CRYSTAL STAR AND SUN LIGHT.

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**BRACKETS, PENDANTS, AND VESTIBULE LIGHTS;**

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PRINCIPAL DEPOT AND LONDON SHOW-ROOMS—

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Estimates and Designs for Lighting and Ventilating Theatres, Concert-Rooms, Public and Private Buildings, can be had upon application at the above Address.

*Registered Designs of Crystal Chandeliers, for Gas or Candle, always on Show.*

The PATENT GAS-REGULATOR AND PURIFIER, reduced to 6s. 6d. per dozen.

A Large Assortment of Gas Moons, Chimneys, and Reflectors, of every description, always on hand.

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**ALL GOODS KEPT IN STOCK, AND SUPPLIED AT MANUFACTURERS PRICES.**

Cast-Iron Socket, Flanch, Hot Water-Pipes and Connexions, for Gas, Water, and Steam purposes, Rain-Water-Pipes and Guttering, &c. Furnace-Pans and Stable-Fittings. Retorts, Hydraulic Main, Furnace-Work, &c. Lamp-Columns, Lanterns, Cocks and Burners, Wrought-Iron Tubing, &c., of best description. Screw-Cocks, Sluices, and Gas-Valves of every description. Bar, Rod, Plate, and Hoop-Iron Bolts and Nuts. Cast-Iron Columns, Girders, Street-Posts, Watering-Posts, Gutters, Gratings and Railing-Bars, Tank-Plates, and Pump-Castings. Engine, Mill, and Lathe Castings. Planing, Turning, and Boring executed. Cast-Iron Pans, for Soap and Chemical Works. Galvanized Cast-Iron Jars and Pots, for Sugar Refiners. Stourbridge and Newcastle Fire-Bricks, Retorts, Lumps, Tiles, and Clay. Malleable Iron Castings. Pipe-Laying by Contract. Double-Refined Machinery Oil. Iron Borings. Salammoniac and Sulphur.

Castings made in Town or Country, on the shortest notice, to Sketches, Drawings, or Patterns.

Best Animal Charcoal, for Sugar Refiners, and Case-Hardening.

Best prepared Wood Charcoal. Prepared Fuel for Smokeless Stoves guaranteed. Granulated Charcoal for Air and Water Filters. Chemists and Druggists supplied with Pulverized Carbon. Charcoal and Coke Blacking, and Coal-Dust, and superior strong Coke, for Foundry purposes. Gypsum of the finest and purest quality. Sulphate of Ammonia.

*Estimates given, and Orders by Post punctually attended to the same day.*

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**BECK'S PATENT STOP-VALVES,**

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WALSALL, STAFFORDSHIRE. ESTABLISHED 1830.

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MANUFACTURERS OF

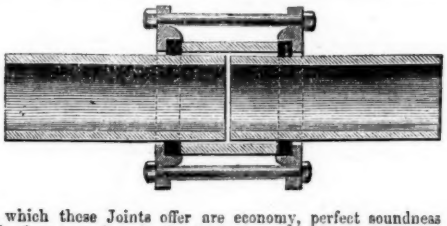
## WROUGHT-IRON TUBES AND FITTINGS,

**For Gas and High-pressure Water and Steam.**

## DR. NORMANDY'S

# PATENT PIPE-JOINTS.

**HOLLY BUSH PLACE, BETHNAL GREEN ROAD, N.E.**



The advantages which these Joints offer are economy, perfect soundness and durability, ease and rapidity of application, use of perfectly plain pipes, without sockets, screws, or projections of any kind, so that a tight Joint may be made, even though the ends of the pipes to be united do not come close together. Any ordinary labourer is capable of securely fixing them.

These Joints are particularly applicable to gas, water, and suction-pipes, the Joints remaining permanently sound; they are cheaper than the socket and spigot at present in use for gas and water-pipes, inasmuch as they save the lead, the gasket, the iron forming the socket (which, for example, in a 3-inch main amounts to 10 lbs.), and the fire necessary for melting the lead; a considerable saving is also effected in the time of making the Joint, more than four Joints being completed in the time required to make only one of the others.

By unscrewing two bolts, a pipe can instantly be taken up or removed, and another substituted for it with the greatest facility.

By means of these Joints, pipes made of either wrought or cast-iron, copper, lead, tin, earthenware, glass, paper, bitumen, gutta-percha, suction-hose, and, in fact, any material of which pipes or tubes can be manufactured, may be rapidly and soundly united, and taken apart with extreme facility.

They are made of all sizes, so as to suit pipes ⅛ of an inch external diameter and upwards.

TO INVENTORS AND PATENTEES.

**MR. W. H. BENNETT, having had** considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

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Information as to cost, &c., supplied gratuitously upon application to the advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

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References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

**SAMUEL CUTLER, Gasholder** MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

**JAMES OAKES and CO.,**
ALFRETON IRON WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

**BIRTLEY IRON WORKS,**
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Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-irop Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

**BEVERLEY'S Patent Equitable** GAS-METER,
**From which the Water cannot be abstracted.**

JOHN BEVERLEY & SON,
GAS-METER MANUFACTURERS, &c.,
LEEDS, YORKSHIRE,

Are prepared to supply the above Meters, either stamped or otherwise, and to adapt their patented principle to any old Meters that may be sent to them to be repaired, tested, and stamped.

Manufactory, No. 9, Mark Lane, LEEDS.

**ROBERT MACLAREN and CO.,**
EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

**LESLIE'S PATENTS: Gas and** Coke from common Coal, greatly increased in value.—60, Conduit Street, LONDON, W.

**LESLIE'S PATENTS: Up to** Forty Candle Gas.—60, Conduit Street, LONDON, W.

**LESLIE'S PATENTS: Licenses** for England, Scotland, and Ireland, the 86 Departments of France and Belgium.—60, Conduit Street, LONDON, W.

**LESLIE'S PATENTS: The** National Waste Heaps at Collieries UTILIZED for Gas purposes.—60, Conduit Street, LONDON, W.

**ALFRED PENNY, Gas and** CONSULTING ENGINEER,
WENLOCK IRON WORKS,
21 & 22, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

**N. DEFRIES,**
Consulting Gas Engineer, Inventor and Patentee of
**WET GAS-METERS,**
with Self-Adjusting Water-Line;
**DRY METERS,**
Gas-Heating Baths, Ovens, Stoves, Gas Fires with Indestructible Fuel, &c.
Factory: Diana Place, Fitzroy Square. Office: 406, Euston Road, LONDON, Eight Doors from Factory

A very severe illness, which confined me for some months to my bed, prevented me from entering into arrangements for the exhibition of my Patent Dry Gas-Meter, and other Patent Inventions in the present International Exhibition, all the space having been allotted before my recovery. I have, however, had the good fortune, through the medium of the Western Gas Company to have one of my Meters for 150 lights, and also one for 60 lights, supplied by Messrs. De Ville, and Co., Strand, at work in the supply of gas to the above building, where they give perfect satisfaction.

My Meters, for which I received the medal, &c., at the Exhibition of 1851, have now stood the test upwards of 20 years, and I challenge the world to surpass them.

The following are a few of the many testimonials I have received, and which prove their superiority over any other Meters.:—

*Copy of Letter received from Messrs.* SHOOLBRED *and* CO. *Tottenham Court Road.*

*May* 8, 1862.

Sirs,—In reply to your letter, respecting Gas-Meters manufactured by Mr. Defries, we can say there are 7 in our establishment; some have been in use 20 years, and they are all dry.

We have discontinued Water-Meters some years. Your letter was overlooked in the pressure of business.—We, are sirs, your obedient servants,

(Signed) J. SHOOLBRED and Co.
H. BOWEN.

To Messrs. A. W. Harris and Co., Dublin.

*Copy received from Messrs.* E. MOSES *and* SON, *Minories, Aldgate.*

*May* 9, 1862.

Dear Sir,—We have much pleasure in bearing testimony to the efficiency of your Patent Dry Gas-Meters, which we have had in our establishment as above several years, and are still working satisfactorily.—Yours, &c., (Signed) E. MOSES and SON.

Mr. N. Defries.

*Copy of Letter received from Mr.* T. W. COOKE, *gas-fitter, &c., 23, Mary Street, Hampstead Road.*

Dear Sir,—I have great pleasure in informing you, and which I think will be satisfactory for you to know, that I took down a 200-light Dry Meter, of your make, May 7, 1862, to be tested: this was supplied to the Chartered Gas Company, June 1855, No. 59,000, and fixed at Messrs. Firmins, White Horse Yard, Drury Lane, after the usual tests by the Government gas-inspector, as per Sales of Gas Act, it was found perfectly correct, and refixed the next day, and I think it also right to add that the Meter has undergone several severe tests while at work.—I remain yours truly,

(Signed) T. W. COOKE.

Mr. N. Defries, Euston Road.

THE ST. PANCRAS WORKHOUSE GAS-METERS.

*To the Editor of* THE ST. PANCRAS REPORTER.

Sir,—In justice to myself, and to the public at large, I beg to inform you that the 200-light gas-meter placed at the St. Pancras Workhouse gate, and the 100-light meter placed in the body of the house, were both manufactured by me, and supplied to the workhouse about four years ago. These two meters have been tested by the Government Inspector, at the office, St. Martin's Lane, and were reported upon in your issue of May 24, when Mr. Robson observed in the vestry that the Government Inspector said the 200-light meter was the largest and most correct meter he had ever tested. The above meters were also referred to in your issue of June 7, and reported as having been found perfectly correct.

The following is an exact copy extracted from the office-register of the inspector appointed under the "Sales of Gas Act" with refence to both meters:—

The 200-light meter, registering 1200 feet per hour, registered ·45 too fast.

The 100-light meter, registering 600 feet per hour, registered ·69 too slow.

As it is exceedingly difficult to produce a meter that shall register accurately and without variation for a very long time together, the "Sales of Gas Act" provides that where a meter registers 3 per cent. too slow (that is, in favour of the consumer), or 2 per cent. too fast, which, of course, is in favour of the gas company, such meter shall be deemed correct. You will see, therefore, that my meters after four years use have not, both together, varied more than 1½ per cent., and that in favour of the consumer; and that this proves a degree of perfection in their construction which might well draw from the inspector the high encomium he bestowed upon them when tested by him.

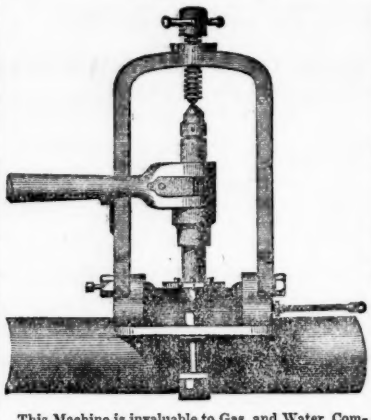
From some error of your reporter in your issue of the 24th of May, my name is given as the inspector instead of the manufacturer of the meters.

With regard to to the meter placed in the basement of the workhouse reported on in your issue of June 7, as registering over 5 per cent. too fast (that is, in favour of the gas company), it was not one of my make, and, I believe, it had only been in use about twelve months. Of course, it was tested by the gas company, as all the meters are, and, I presume, was correct when put down. I need not point out the vast superiority of my meter to that now referred to; suffice it to say, it has been returned to the gas company by the parish authorities, and a new 100-light meter of my manufacture purchased of me, and put down in its stead.

I am, Sir, yours respectfully,

*June* 26, 1862. N. DEFRIES.

**SIMMONS'S**
**PATENT GAS AND WATER CONNECTOR.**



This Machine is invaluable to Gas and Water Companies, Gas-Fitters, &c., being the only Connector whereby accidents can be prevented. It is simple in construction, economical in saving the escape of Gas, and can be worked by a labourer.

No. 1 size, to suit ¾ and ½ in. Services, £6. 6s. each.
„ 2 „ „ ¾ and 1 „ „ £8. 8s. „
„ 3 „ „ 1¼, 1½, & 2 in. „ £12. 12s. „
Including Rachet Brace, Drills, Taps, &c., complete.

**MANUFACTURER,**
J. COWDY,
**BOND COURT, WALBROOK,**
LONDON.

Connectors made for fixing on the ends of Mains, to prevent escape in course of laying.

**GEORGE CUTLER & CO.,**
GAS ENGINEERS, &c.,
**London Gasholder and Boiler Works,**
8, WHARF, WENLOCK ROAD, CITY ROAD, N., LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

**DUPLEX GOVERNOR,** for Gas-EXHAUSTER ENGINES.
D. LANE'S PATENT.

This Governor combines great delicacy with remarkable certainty of action. A pressure of one-tenth of an inch of water, operating on a diaphragm of 3 inches diameter, is sufficient to work the Regulating-Valve of an Engine of any power.

TESTIMONIALS.

Borough Engineer's Office, Town Hall
Halifax, March 29, 1862.

Dear Sir,—I have much pleasure in bearing my testimony to the efficiency of your Duplex Governor for regulating the speed of Gas-Exhausters.

The Governor has been perfectly self-acting, and has never given us one moment's thought, trouble, or expense. The engine-man has only to weight the tappets to the required vacuum, and the pressure-register paper never shows a greater variation than three-tenths in the twenty-four hours.

I can very confidently recommend the adoption of it to engineers and managers of gas-works making 50 million feet a year and upwards.

I am, dear Sir, yours faithfully,
G. W. STEVENSON.

Denny Lane, Esq., Cork Gas-Works, Ireland.

Gas-Works, Cork, April 4, 1862.

Dear Sir,—Having for some time past had in use three of your newly-invented Regulators for governing the speed of Steam-Engines in connexion with Gas-Exhausters, I am glad that I am able to speak of this valuable machine in terms of the highest praise. I have had them applied, as you know, to high-pressure and condensing engines, with Beale's and also Anderson's Exhausters. In every case, this small and valuable instrument is thoroughly effective in regulating the speed of the Exhauster. No amount of care with the hand can equal its accuracy of action for the intended purpose.

Denny Lane, Esq. A. H. STILL, C.E.

An Illustrated Circular, explaining the operation of the Governor, can be obtained by application to D. LANE, 72, South Mall, CORK; and the Governor can be seen in London at the Offices of GEO. ANDERSON, Esq., C.E., 16, Adam Street, ADELPHI.

**WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,**
GLOBE PATENT TUBE WORKS, WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

**JOHN ROGERSON and CO.**
NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:
12, ROYAL EXCHANGE BUILDINGS.

**BENJAMIN GIBBONS, Jun.,**
DEEPDALE FIRE-CLAY & BRICK WORKS,
**Near DUDLEY,**

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

**FIRE-CLAY RETORTS,**
TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

**WALTER MABON, Engineer,**
ARDWICK IRON WORKS, FAIRFIELD STREET, MANCHESTER,
Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contracts for Gas-Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

**ANDERSON'S EXPERIMENTING LABORATORY**
AND
**GAS ENGINEERING OFFICES,**
16, ADAM STREET, ADELPHI, W.C.
*(Close to the Society of Arts.)*

Mr. ANDERSON continues to Erect, or to supply the Drawings for his PATENT RETORT-SETTINGS. On this principle, three Ovens of Retorts are heated by one Coke and one Tar fire; and, for small Works, the principle is adapted to single Ovens in both cases, with a total absence of smoke, while the duration of the Retorts is from two to three years, and with great economy of fuel.

Mr. ANDERSON continues to supply his PATENT GAS-EXHAUSTER, together with Steam-Engines, &c., erected complete.

This is the most simple machine of the kind in use, being merely a double-action Pump, which any one can comprehend, and works for years without any repair.

Also, his PATENT FOUR-WAY VALVES. One of these valves does the work of three ordinary valves, when applied to Purifiers, Station-Meters, or other Gas Apparatus.

A workman cannot, by any possibility, make the mistake of shutting one passage without opening another; thus ensuring a constant flow of the gas.

All Racks, Pinions, Springs, and other delicate parts of ordinary valves, are in these valves abolished; the Connecting-pipes are also much simplified, and the cost reduced fully 30 per cent.

Also, his CONCENTRIC GOVERNOR, which stands in half the space of the ordinary Governor, and regulates the flow of Gas to the greatest nicety.

Mr. ANDERSON having five Gas-works on lease, besides being engineer to several others, has constant opportunities of perfecting his inventions before they are brought under public notice.

Mr. ANDERSON, in conjunction with Mr. STEVENS, of the Darlington Works, has recently erected and leased for a term of years, two Gas-Works of the Government, one at VICTORIA HOSPITAL, the other at the CAMP at ALDERSHOTT. At both places, the above designs are introduced, and cards to view may be had on application; as also, references to gentlemen who have used his apparatus for years.

Mr. ANDERSON may be consulted on all matters connected with the Manufacture of Gas, the Construction of new, or the reconstruction of old Works, Valuing the same, or obtaining parliamentary powers.

The Laboratory is being fitted up with apparatus for testing the chemical and photometrical properties of Coal-Gas, and also that of Meters, agreeably with the Act of Parliament. Gentlemen desirous of inquiring into such matters, are invited to pay a visit.

# COCKEY'S PATENT GAS-VALVES.

These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one.

The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and, when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.

These Valves are adapted either for bye-passes; for connecting two, three, and four purifiers; or for the inlets of several Gasholders, and are in use for these purposes at the following Works:—

| | | | |
|---|---|---|---|
| ALTON, HANTS. | CLEVEDON. | ENNISCORTHY. | NEWPORT, MONMOUTH. |
| BRIGHTON. | CHELTENHAM. | FROME. | REDRUTH. |
| BASINGSTOKE. | CHATTERIS. | GODALMING. | RYDE, ISLE OF WIGHT. |
| BLANDFORD. | CUCKFIELD. | HESSLE. | SALISBURY. |
| BARKING. | EASTBOURNE. | LANGPORT. | WARMINSTER. |
| CANTERBURY. | ELGIN. | MALVERN. | |

Besides many small private Gas-Works.

There are Two specimens at the International Exhibition in Class 10; one of them represents the Valve with its Index-Plate fixed for regulation, and the other shows the Valve open, exposing its passages.

**IRON WORKS, FROME SELWOOD.**

# R. LAIDLAW & SON,

GAS ENGINEERS, IRON & BRASS FOUNDERS,

**Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,**

**GLASGOW;**

AND AT SIMON SQUARE, EDINBURGH;

MANUFACTURERS OF

**STATION & CONSUMERS METERS, ALL SIZES;**

WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES;

**HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.**

**GASHOLDERS;**

GOVERNORS, SLIDE-VALVES, &c.;

WROUGHT & CAST IRON ROOFS & HOUSES.

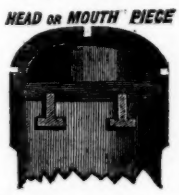
*Contractors for Gas-Works of any Magnitude.* *Plans, Specifications, and Estimates furnished.*

SOLE AGENT FOR THE SOUTH, SOUTH-EAST, AND SOUTH-WEST OF ENGLAND:—

**J. E. DOWSON, 38, DOWGATE HILL, THAMES STREET, LONDON, E.C.**

# KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

**Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.**

**Every Retort and Brick is branded "King Brothers, Stourbridge."**

# FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

# JOSEPH CLIFF and SON,

**WORTLEY FIRE-BRICK WORKS, near LEEDS,**

**Are Awarded the PRIZE MEDAL for Excellence of Material and Manufacture of Clay Retorts, July 11, 1862.**

**Class X., No. 2259.**

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

**For EXPORT from the Ports of LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.**

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

**M. P. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.**

## International Exhibition, 1862.

MESSRS.

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Manufacturers of Croll's Patent Improved

# DRY GAS-METER,

Exhibited in Class XXXI. (B),

Have obtained the Medal for

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MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

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# JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

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ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

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# D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE BLACK & GALVANIZED. COPPER, TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

*Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.*

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Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.


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